



Climate change denial: the effects of ideological polarisation and threat

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Climate Change Denial: The Effects of Ideological Polarisation and Threat

Edward Clarke

Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

Deakin University
JUNE 23, 2017



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This thesis is dedicated to future generations, who bear the consequences of the actions of those passed.

Abstract

Right-wing adherents in the U.S. and Australia are significantly more likely to deny climate change than their left-wing counterparts (Capstick, Whitmarsh, Poortinga, Pidgeon, & Upham, 2015; McCright & Dunlap, 2011a; Pew Research Center, 2014; Reser, Bradley, Glendon, Ellul, & Callaghan, 2012), making this a politically-polarised issue. However, our understanding of the mechanisms that underpin the relationship between political ideology and climate change denial is limited. This thesis applies a System Justification Theory approach to understand the relationship between types of political ideology and climate change denial by examining the mediating role of perceived climate change mitigation threat. To do this, community understanding of climate change was explored in an elicitation study (Study One) to assist in the construction of a comprehensive measure of climate change denial. Following this, a pilot study (Study Two) was conducted to test an existing climate change scale that addressed conceptual and measurement issues highlighted by the findings of Study One. The next step was to test the System Justification Theory claim that higher perceived threat to the socioeconomic system leads individuals, and right-wing adherents in particular, to engage in system justification in a general context (Feygina, Jost, & Goldsmith, 2010). Study Three achieved this by utilising the Dual Process Model of Ideology (Duckitt & Sibley, 2010) to explore the differential effects of Right-Wing Authoritarianism (RWA) and Social Dominance Orientation (SDO) on system justification tendencies. Studies One to Three informed the design of the final study (Study Four), which examined the mediating effect of perceived climate change mitigation threat on the relationship between our multidimensional model of ideology (RWA and SDO) and climate change denial. This study found that SDO and the Conventionalism facet of RWA were positively associated with all types of climate change denial, and that these relationships were partially mediated by climate change mitigation threat. These findings provisionally support the argument that

certain right-wing adherents will engage in climate change denial at least in part due to a perception that mitigation strategies to combat climate change will threaten the socioeconomic status quo.

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Table 1 Political orientations and countries of political parties mentioned throughout the thesis

Political Party	Known As	Political Orientation	Country
Australian Greens	Greens	Centre-left / Liberal	Australia
Australian Labor Party	Labor/ALP	Centre-left / Liberal	Australia
Liberal Party of Australia	Liberals	Centre-right / Conservative	Australia
National Party of Australia	Nationals	Centre-right / Conservative	Australia
Republican Party	Republicans	Centre-right / Conservative	United States of America
Democratic Party	Democrats	Centre-left / Liberal	United States of America

Chapter One: Overview of the thesis

Climate scientists are virtually unanimous in their opinion that climate change is occurring, is caused in large part by human behaviour, and will result in serious and dire ecological consequences (Anderegg, Prall, Harold, & Schneider, 2010; Cook et al., 2016; IPCC, 2014). Despite this, there is a significant discrepancy between the level of scientific consensus and ordinary citizens' climate change beliefs (Doran & Zimmerman, 2009), particularly in the UK, Australia, and the U.S., where increases in climate change denial have been observed (Capstick et al., 2015).

As this thesis will show, the issue of climate change is politically-polarised. Political conservatives in the U.S. and Australia are significantly more likely to deny climate change than their liberal counterparts (Capstick et al., 2015; McCright & Dunlap, 2011b; Pew Research Center, 2016; Reser et al., 2012). This is a problem as climate change denial leads to a decrease in support for mitigation policies (Dietz, Dan, & Shwom, 2007; O'Connor, Bord, & Fisher, 1999; Zhao, Leiserowitz, Maibach, & Roser-Renouf, 2011), and belief in climate change could lead to increased support for action (van der Linden, Leiserowitz, Feinberg, & Maibach, 2015). However, our understanding of the mechanisms that underpin the relationship between ideology and climate change denial is limited.

Aims and Scope of the Thesis

Within this context, the aim of this thesis is to apply a System Justification Theory approach to understand the relationship between types of political ideology and climate change denial by examining the mediating role of perceived climate change mitigation threat. To achieve this, the research problem was divided into two overarching steps, to arrive at a final study addressing the research aim. This is outlined in Figure 1.

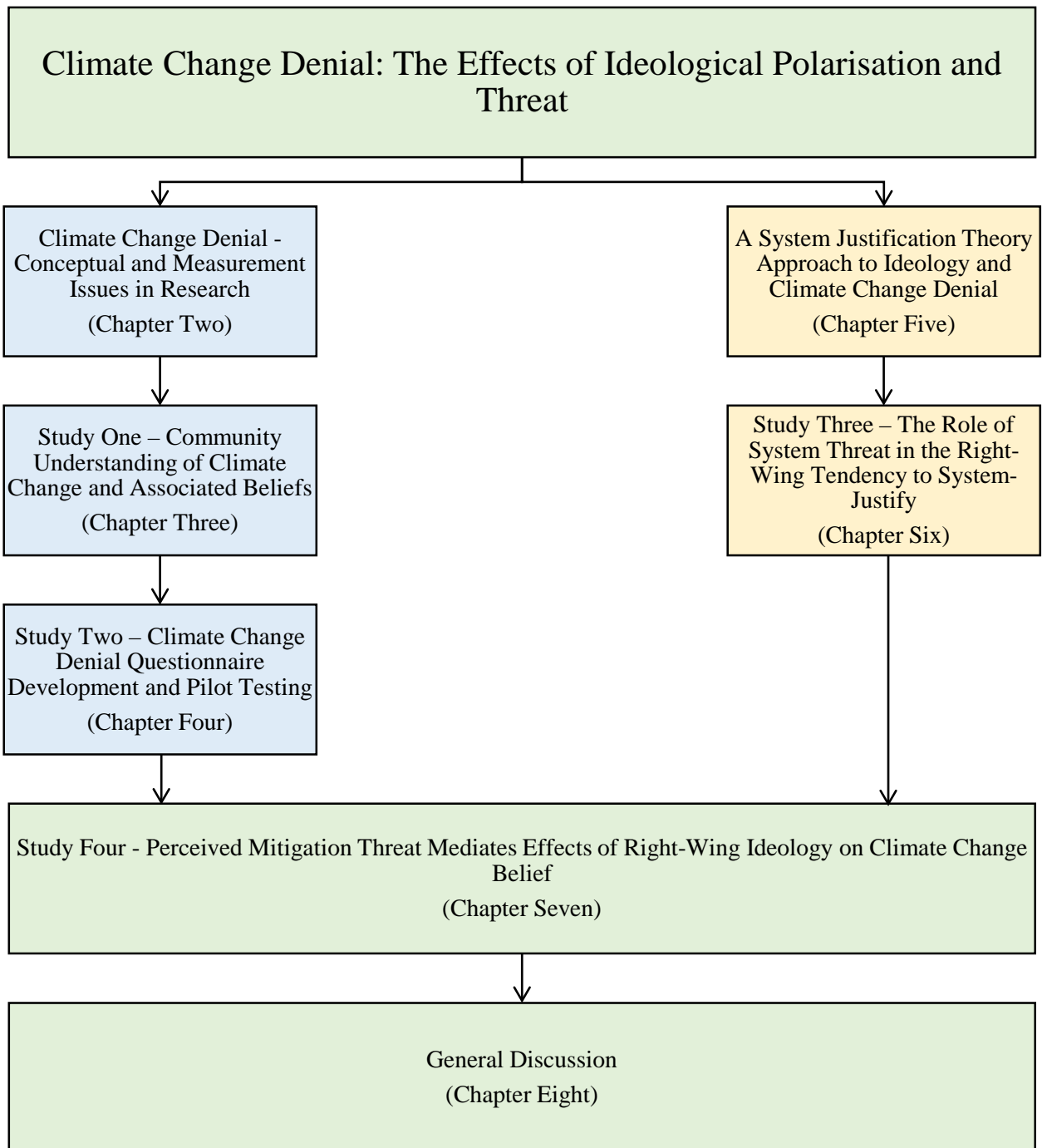


Figure 1 Overview of chapters within the thesis

Structure of Thesis and Organisation of Chapters

Chapter Two: Climate Change Denial – Conceptual and Measurement Issues in Research. In order to properly understand climate change denial and its determinants it is important to explore climate change and climate change denial as they have been represented in past studies. This allows for identification of conceptual and measurement issues within this body of research that influence the interpretation of findings. In particular, past research into climate change denial has been inconsistent in its use of key terminology (e.g. interchanging use of global warming and climate change across studies) as well as item wording in belief measures. As such, inconsistencies in use of terminology in past studies and the different types of climate change denial are detailed.

Chapter Three: Study One – Community Understanding of Climate Change and Associated Beliefs. As established in Chapter Two, past research into climate change denial and its correlates has suffered from problematic conceptualisation and measurement of the construct. This includes switching of terminologies between studies (e.g. from global warming to climate change), an inconsistent definition of climate change denial (e.g. denial of existence, anthropogenic cause, or impact), only measuring one such type of denial at the exclusion of others, and measuring climate change denial by conflating it with related phenomena in items (e.g. asking participants their beliefs about rising temperatures instead of climate change). Ultimately, little formative work to our knowledge has been conducted to examine community understanding of climate change as a method to assist the construction of a comprehensive climate change denial measure. Study One, detailed in Chapter Three, addresses this gap using a belief elicitation approach.

Chapter Four: Study Two – Climate Change Denial Questionnaire Development and Pilot Testing. Study two tests an existing climate change denial scale that was published shortly after the conclusion of the elicitation study (Study One). This scale was

selected as it addressed key concerns raised by that study. However, as it was a translated scale that had never been used in a sample of participants from an English-speaking country, there was a need to first pilot the English translation of the scale.

Chapter Five: A System Justification Theory Approach to Ideology and Climate

Change Denial. Following the pilot study, the focus of the thesis shifts to the theoretical approach taken to address the main aim of this thesis – To understand the psychological underpinnings of the relationship between right-wing ideology and climate change denial. Outlined in Chapter Five is the evidence for the link between political ideology and climate change denial, and our limited knowledge about what drives denial in right-wing adherents.

The first step in understanding this relationship is to explore the construct of ideology and how it is conceptualised in the social psychology literature. As such, I outline a critique of the common unidimensional approach to ideology. Through this Chapter, I advocate for the use of a multidimensional ideological model in climate change denial research. This ideological model conceptualises ideology as two distinct but related dimensions – Right-Wing Authoritarianism (RWA), which represents social or cultural conservatism, and Social Dominance Orientation (SDO), which represents an economic dimension of conservatism. The advantage of this approach is that it allows examination of different ideological paths to climate change denial, which adds nuance and complexity to our understanding of denial. While this approach has only been used in a handful of climate change belief-related studies, those studies have demonstrated that both ideological dimensions may be important in predicting climate change denial. These results underscore the merit of using this approach for understanding the climate change denial – ideology link.

I then return to potential explanations for this relationship. One possible explanation for the climate change denial – ideology association is that right-wing adherents tend to deny climate change as a way to reduce the perceived threat to the socioeconomic system that

climate change mitigation poses. This explanation is derived from System Justification Theory, which predicts that individuals, and right-wing adherents in particular, will protect the status quo when it is under threat. However, the explanatory effect of threat on the right-wing tendency to system-justify has not been established. Additionally, the effect of climate change mitigation threat has not been explored in the relationship between ideology and climate change denial.

Chapter Six: Study Three – The Role of System Threat in the Right-Wing Tendency to System-Justify. To establish that perceived threats to the system result in heightened system-justifying tendencies in right-wing adherents, Study Three aimed to examine the mediating effect of a system threat variable (Belief in a Dangerous World) on the relationship between right-wing ideology and two types of system justification tendency (economic and general). Additionally, by adopting the Dual Process Model conceptualisation of ideology and comparing a model using self-placement ideological orientation (unidimensional model) with two ideological dimensions in RWA and SDO (multidimensional model), the study was able to examine whether there are differential ideological effects on system justification outcomes, to gather a more nuanced understanding of the different ideological underpinnings of the tendency to justify and maintain the status quo.

Chapter Seven: Study Four - Perceived Mitigation Threat Mediates Effects of Right-Wing Ideology on Climate Change Belief. The aim of Study Four was to extend understanding of the relationship between political ideology and climate change denial by examining the mediating role of climate change mitigation threat. This study also used the multidimensional model of ideology to examine whether there are differential associations between the climate change denial outcomes and two types of ideology (RWA, SDO).

Chapter Eight: General Discussion. Chapter Eight concludes the thesis by summarising and integrating the findings of the empirical studies. Implications of these findings for understanding the politically-polarised nature of climate change denial, theoretical implications for System Justification Theory, and the conceptualisation of political ideology in social and political psychology research are discussed.

Chapter Two: Climate Change Denial – Conceptual and Measurement Issues in Research

Climate Change

Climate change is defined by the IPCC as “a change in the state of the climate that can be identified by changes in the mean and/or variability of its properties, and that persists for an extended period, typically decades or longer” (International Panel on Climate Change (IPCC), 2014 p.5). Overwhelmingly, scientific evidence suggests that climate change is occurring; is caused in large part by human behaviour; and will result in serious and dire ecological and societal consequences (Anderegg et al., 2010; Cook et al., 2016; IPCC, 2014). According to the latest IPCC report (IPCC, 2014), climate change will impact natural environmental systems, species migration patterns, crop yields and food security. Climate change is also expected to lead to: increased heat-related mortality in humans, increased vulnerability for the socioeconomically disadvantaged, extreme weather events such as heat waves and droughts, and water insecurity (IPCC, 2014). As such, climate change is one of the most important and challenging issues facing humanity. Human involvement in climate change exacerbation is in large part a function of our reliance on burning fossil fuels for energy, which results in harmful greenhouse gas emissions that contribute to climate change (IPCC, 2014). The far-reaching implications of continued increases in global average temperature means that urgent action is required to mitigate further temperature increases to avoid catastrophic and irreversible damage (IPCC, 2014; National Research Council, 2015).

Climate Change Denial¹

Despite this, there is a significant discrepancy between the level of scientific consensus and ordinary citizens' climate change beliefs (Doran & Zimmerman, 2009). Worldwide, levels of concern regarding climate change were trending upwards until 2007, at which point there was a sharp decline followed by a stabilisation in some nations from 2010 (Capstick et al., 2015). In particular, the UK, Australia, and the U.S. saw larger increases in climate change denial than in other parts of the world (Capstick et al., 2015). According to Saad (2015), around 33 per cent of United States citizens do not believe that the effects of global warming have begun, while 41 per cent believe that global warming is due to natural causes rather than human activity. In an Australian sample, 22 per cent of respondents believe that climate change is not happening (Leviston, Greenhill, & Walker, 2015), and just under half (46.5%) of respondents do not believe that humans are the predominant cause for climate change or do not believe that climate change is happening. In sum, a significant number of individuals either do not believe that climate change exists, do not believe that it is caused in large part by

¹ Social psychological literature examining the concept of climate change denial, as has been referred to so far in this thesis, is at times also labelled climate change belief (e.g. Bord, O'Connor, & Fisher, 2000) and climate change scepticism (e.g. Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011). This thesis will continue to use the term "climate change denial". Although it is acknowledged that not every person denying the existence of climate change is necessarily aware of the body of evidence supporting climate change, or even understands it at a basic level, and is therefore not deliberately engaging in scientific malpractice, the term "climate change denial" is used to refer to a general phenomenon rather than the behaviour of specific individuals. Indeed, denial of, or acceptance of, climate change will fall upon a continuum, and many people may fall somewhere in the middle and not be considered necessarily a sceptic or denier by definition. However, the focus of this research is in denial of climate change and not the level of scientific scepticism with respect to the specific empirical evidence for climate change. Climate change denial is treated as a variable that ranges from low or no denial to high levels of denial.

human behaviour, do not believe that it poses problems in the near future, or some combination of these (see also Ashworth, Jeanneret, Gardner, & Shaw, 2011).

Attitudes toward climate change are politically-polarised. Right-wing adherents in the U.S. and Western Europe are significantly more likely to deny climate change than their left-wing counterparts (Capstick et al., 2015; McCright & Dunlap, 2011b; McCright, Dunlap, & Marquart-Pyatt, 2016; Pew Research Center, 2016) and there is evidence of similar effects in Australia, such that Liberal/National party voters (two centre-right coalition parties) are more likely to deny the reality of anthropogenic climate change than centre-left party voters (Reser et al., 2012). Of further concern is the potential for climate change denial to be relatively stable among right-wing adherents, as was demonstrated in an analysis of U.S. anthropogenic climate change belief data from 2010 to 2015 (Hamilton, Hartter, Lemcke-Stampone, Moore, & Safford, 2015). This may indicate that positions on climate change among right-wing adherents have hardened somewhat and therefore they may be more difficult to shift.

Similar polarisation effects also exist at the level of political elites. In Australia, Australian Labor Party and Greens politicians (parties considered to be centre-left or progressive) were significantly more likely to see climate change as actually happening and as a threat to humanity than Liberal/National Party politicians (Fielding, Head, Laffan, Western, & Hoegh-Guldberg, 2012). Data from the 2010 Australian Electoral Survey also point to significant differences in politician and candidate opinions regarding the severity of threat posed by climate change, such that Labor and Greens politicians are more likely to see climate change as posing a serious threat to way of life than their Liberal and National party counterparts (Tranter, 2013). Worldwide, a review of climate policy in nine Western nations found that the United States Republican Party is the only conservative party to be entirely averse to climate change mitigation measures (Båtstrand, 2015). As such, the level of government response to climate change may differ based on which party or group of parties

is in power, rather than the overwhelming scientific consensus. Furthermore, differences in party position on climate change and mitigation is likely intertwined with the polarisation of climate change at the level of the voter (Cohen, 2003).

Understanding beliefs about climate change and their antecedents is important due to the effect of these beliefs on support for climate change mitigation. A number of studies suggest that climate change denial could lead to a decrease in support for various types of climate change mitigation policies (Dietz et al., 2007; O'Connor et al., 1999; Zhao et al., 2011), and that belief in climate change could lead to increased support for action (van der Linden et al., 2015). In support of this, a meta-analysis of climate change belief and its correlates (Hornsey, Harris, Bain, & Fielding, 2016) showed that belief in the existence of climate change is positively related to policy support ($r=.32$), support for a carbon tax or cap and trade ($r=.21$) and willingness to prioritise the environment over the economy ($r=.38$). In addition to the evidence linking climate change belief with policy support and environmental prioritisation, experimentally increasing levels of perception of scientific consensus surrounding climate change was demonstrated to cause an increase in climate change belief, which in turn caused an increase in support for public action (van der Linden et al., 2015). These findings highlight the importance of understanding climate change denial and its antecedents. Furthermore, given that science scepticism is a problem in other areas such as health care (e.g. anti-vaccination movements; Black & Rappuoli, 2010), gaining an understanding of the psychological underpinnings of climate change denial may also assist us in understanding denial or scepticism in other domains where scientific consensus is high.

Climate Change Denial - Conceptual and Measurement Issues

In order to properly understand climate change denial and its determinants it is important to first explore climate change and climate change denial as they have been represented in past studies and the potential limitations that arise and affect interpretation of findings. In

particular, past research into climate change denial has been inconsistent in its use of key terminology (e.g. interchanging use of global warming and climate change across studies) as well as item wording in belief measures. Additionally, existing comprehensive measures of climate change denial (e.g. Heath & Gifford, 2006) have been constructed by the researchers without formative item development work. This section will provide an overview of these key methodological and scale construction issues as they relate to this thesis.

Climate Change Understanding

Climate Change vs. Global Warming

Although causally related, “global warming” and “climate change” are distinct phenomena. Global warming refers specifically to surface temperature increases whereas climate change is a more general term that refers to the long-term change in the earth’s climate (National Research Council, 1979). These terms are sometimes used interchangeably in the climate change denial literature, which could pose a significant problem when examining the influence of ideology on climate change denial given partisan differences in the perception of, and preferences for, the terms (Akerlof & Maibach, 2011; Schuldt, Roh, & Schwarz, 2015). For example, a study of partisan websites (i.e. conservative and liberal “think tanks”) found that conservatives were more likely to use the term “global warming” whereas Liberal sites tended to use the term “climate change” (Schuldt, Konrath, & Schwarz, 2011). Interestingly, the same study found that self-identified Republicans are more likely to believe that the phenomenon is real when it is termed “climate change” than when it is referred to as “global warming” (Schuldt et al., 2011). Additionally, preference for and understanding of terms may differ based on nationality and socio-political context. One study sampling English participants found that they demonstrated more concern when the term “global warming” was used (Whitmarsh, 2009). Despite this, analysis of data from Gallup

polls of US participants suggests that there is no statistical difference in patterns of response regarding belief when the terms “climate change” and “global warming” are switched (Dunlap, 2014), which may reduce the need for concern. Nevertheless, it is difficult to know whether this has always been the case, or whether individuals have only just begun to understand the terms and how the phenomena relate to each other. Any difference in response based on the terms used affects the interpretation of climate change denial survey responses, and may also affect interpretation of levels of support for climate change mitigation. Given the possibility that the use of these terms may elicit different belief responses, particularly as a function of ideology, it would be useful to examine community understandings of both terms when considering the use of either in item construction for scales measuring climate change beliefs.

Climate Change as Beneficial

Differences in understanding of the consequences of climate change across individuals and communities means that it can be difficult to accurately and meaningfully measure climate change denial. Climate change has not always been viewed as a negative phenomenon, particularly in Western culture (Hulme, 2009); it has been suggested that a small increase in average global temperature could result in a net benefit to the global economy (Tol, 2009), although this is strongly contested (e.g. Pindyck, 2013). Although there is a large amount of research on the issue of climate change denial, associated beliefs and their correlates, there is little critique with respect to the subjective understanding and perception of climate change. Studies of climate change denial are rarely based on formative work that examines community perceptions.

Types of Denial

Climate change denial is an umbrella term that encompasses distinct denial types: denial of the existence of climate change (e.g. Feinberg & Willer, 2011; Guéguen, 2012); denial of anthropogenic (or human induced) climate change (e.g. Hoffarth & Hodson, 2016); and denial of climate change impact (e.g. Newport, 2010). Rahmstorf (2004) similarly conceptualises climate change “scepticism” as having types: trend sceptics, or those that deny the increase in global average temperatures; attribution sceptics (those who doubt that human activities are responsible for the upward trend in temperatures); and impact sceptics (who focus on potential positive effects of climate change at the exclusion of the negative consequences). A fourth type is sometimes used which encompasses denial (acceptance) of the scientific evidence for climate change (Feinberg & Willer, 2011; Lewandowsky, Oberauer, & Gignac, 2013) or the belief that there is a lack of agreement among scientists with respect to climate change (Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011).

Although there is sense in conceptualising and measuring climate change denial as three or four distinct (but likely related) types, especially given evidence suggesting that some individuals will reject anthropogenic climate change yet acknowledge the existence of climate change (Leviston, Leitch, Greenhill, Leonard, & Walker, 2011), many studies only focus on one or two types of denial while neglecting the other types (e.g. Feinberg & Willer, 2011; Guéguen, 2012). The effect is that measuring only one type (or measuring all types as a single climate change denial variable) will overlook differences in outcomes between the various types of climate change denial and potentially over-simplify conclusions made about them. It is also possible that determinants of denial differ based on which type of denial is being examined (Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011). Therefore, these types need to be separated and measured as separate aspects of climate change denial to avoid these problems. Any measure that intends to capture the breadth of climate change

denial in the community needs to examine all types identified in the literature (existence denial, anthropogenic denial, impact denial, and science denial) and in a way that minimises conflation.

Conflating Lack of Knowledge with Lack of Belief

Evidence suggests that understanding and knowledge of the phenomenon of climate change can vary (Ashworth et al., 2011; Reynolds, Bostrom, Read, & Morgan, 2010). In studies of laypeople's understanding of climate change, Reynolds et al., (2010) found that many people still did not understand the role that increased atmospheric carbon dioxide plays in climate change, and how these increases are linked to the burning of fossil fuels. This poses problems for scale items that require some level of knowledge of the phenomenon; For example, using belief in the link between burning of fossil fuels and aspects of climate change such as increases in atmospheric temperature in their items to measure acceptance of climate science (Lewandowsky, Oberauer, et al., 2013). While these are objective facts related to climate change, it is possible that some individuals may be broadly accepting of climate science without understanding the specifics relating to the mechanisms causing climate change, especially given the aforementioned findings.

Measurement of Climate Change Denial

In sum, and partly as a result of the conceptual issues of climate change previously mentioned, a number of problems remain regarding the measurement of climate change denial. So far three have been alluded to in particular:

- Of the climate change denial measures that exist, no study conducted formative work (such as elicitation studies) to explore community understandings of, and beliefs about, climate change to assist in the construction of scale items. Formative work

would enable us to assess the ecological validity of existing scales, or indeed create a new climate change denial scale.

- Often only one type of climate change denial is measured, most commonly denial of anthropogenic climate change, even though there is evidence for differences between frequency and antecedents across the different types of climate change denial (Leviston et al., 2015).
- Some items are constructed that assume knowledge on the part of participants (e.g. Guéguen, 2012) despite evidence suggesting inconsistencies in climate knowledge in the general public (Ashworth et al., 2011; Reynolds et al., 2010)

Additionally, when this thesis commenced, no scale encompassed all four identified types of climate change denial (existence/trend, human cause, impact, and science). Only one scale was identified that contained the first three denial types (perception of existence, human cause, and consequences, Heath & Gifford, 2006). However, while the scale addresses many of the concerns raised regarding measurement of climate change denial, it is important that any scale developed also includes measures of denial of climate science, given that climate science denial, or at least the perception that scientists disagree about climate change, is linked to lower levels of support for mitigation (Ding et al., 2011). In sum, any scale that is adopted, modified or constructed needs to take into account the four different types of climate change denial and should consider ways to address differences in community understanding as part of scale development. In order to understand climate change denial we need to examine community understandings of and beliefs about climate change and associated terms. The next chapter will present an elicitation study conducted to address these demands.

Chapter Three: Study One – Community Understanding of Climate Change and Associated Beliefs

As established in the previous chapter, past research into climate change denial and its correlates has suffered from problematic conceptualisation and measurement of the construct. This includes switching of terms between studies (e.g. from global warming to climate change), an inconsistent definition of climate change denial (e.g. denial of existence, anthropogenic cause, or impact), only measuring one such type of denial at the exclusion of others, and measuring climate change denial by conflating it with related phenomena in items (e.g. asking participants their beliefs about rising temperatures instead of climate change). Ultimately, to our knowledge, little formative work has been conducted to examine extant community understanding of climate change in order to inform the construction of comprehensive climate change denial measures.

As such, this chapter reports on an elicitation study that was conducted to inform the construction of items for climate change denial scales. Elicitation studies are designed to elicit participants' salient beliefs about relevant constructs, and involve asking participants to describe the construct in a free-response format in order to identify accessible beliefs (e.g. Fishbein & Ajzen, 2010). The interview responses are then transcribed and coded to examine commonalities in responses to specific constructs. These responses can then be used to identify salient beliefs related to each construct that may be appropriate for use in questionnaire development (Francis et al., 2004; van der Pligt & de Vries, 1998). For instance, asking participants about their beliefs related to the potential impact of climate change should elicit a range of responses. These responses can be examined to identify the breadth of climate change impact beliefs within the sample. These salient beliefs can then inform item and measurement creation. Importantly, this method can identify important beliefs that have not previously been reported in a sample.

Method

Participants

Twenty participants (8 females and 12 males) were recruited online via the social media site Facebook. Advertisements asked for people aged 18 years and over. Participants made email contact, and were interviewed following the return of a signed Plain Language Statement (Appendix A). Ages ranged from 21-63 years ($M=27.75$, $SD=8.74$). The majority (90%) of participants held a bachelor's degree or higher (see Table 2).

Table 2 Demographic Characteristics of Participants (N = 20)

	Gender	Age (years)	Occupation	Education Level
1	Female	24	Student	Bachelor's
2	Female	23	Student	Postgraduate Diploma
3	Female	22	Student	Honours
4	Male	25	Student	Postgraduate Diploma
5	Female	23	Lab. technician	Honours
6	Male	63	Retired	TAFE certificate
7	Female	30	Student	Honours
8	Male	28	Student	Postgraduate Diploma
9	Male	26	Research assistant	Honours
10	Male	25	Hospital administration	Postgraduate Diploma
11	Male	26	Student	Honours
12	Female	26	Social worker	Master's
13	Female	27	Scientist	Bachelor's
14	Male	27	Public servant	Master's
15	Male	28	Student	Bachelor's
16	Female	33	Stay-at-home mum	Honours
17	Male	27	School teacher	Master's
18	Male	21	Student	Year 12
19	Male	26	Public servant	Master's
20	Male	25	Student	Postgraduate diploma

Recruitment

Recommendations for sample sizes in similar studies have ranged from 5 to 25 participants (Guest, Bunce, & Johnson, 2006). The original intention was to recruit a

minimum of 20 participants, and although it was deemed that little new information was evident by the 15th interview, other interviews were already scheduled to occur and were duly conducted as a result.

Procedure

A mix of in-person and telephone interviews were conducted. Participants were asked their age, gender, current occupation, and highest level of education attained, and then asked the schedule of questions found in Table 3 (complete interview materials can be found in Appendix D.1). The questionnaire consisted mainly of open-ended questions inquiring about salient beliefs and experiences related to climate change. A final question gave the participants the opportunity to add any other relevant thoughts on climate change and related concepts. Questions were developed to address key concerns outlined in Chapter Two pertaining to gaps in understanding of community perceptions of climate change. The first two questions attempted to elicit understanding and knowledge about climate change and global warming to gauge how participants thought these constructs related to each other, given the possibility that the use of these terms may elicit different belief responses. Questions pertaining to causes of climate change aimed to elicit understanding of the relationship between human behaviour and climate change, or indeed whether the participant thought that humans were involved in exacerbating these processes. Importantly, these questions would inform the extent to which items pertaining to denial of human cause need to be neutral to the underlying mechanisms, such as burning of fossil fuels. The question pertaining to consequences similarly sought to gauge community understanding of specific impacts of climate change and also just how dire people believe these impacts to be. Again, responses to this would inform the amount of neutrality needed in items pertaining to measurement of climate change impact denial. Likewise, the item querying beliefs about the scientific evidence for climate change sought to understand whether participants had

knowledge of the level of scientific consensus and the quality of evidence supporting climate change.

Table 3 Interview Schedule

Topic	Questions
Global Warming v Climate change	Please describe what comes to mind when you hear the term ‘climate change’ Please describe what comes to mind when you hear the term ‘global warming’
Denial v Scepticism	Please describe what comes to mind when you hear the term ‘climate change denial’ Please describe what comes to mind when you hear the term ‘climate change scepticism’
Belief in and experience of climate change	What is your belief regarding the existence of climate change? Have you experienced anything that you believe might be the result of climate change? If yes, please describe this/these experience(s).
Causes	What do you think might be the cause or causes of climate change? Do you believe that humans are the cause of climate change? If yes, to what extent?
Consequences	Do you believe that climate change will lead to dire consequences? If yes, please describe.
Scientific evidence	What are your thoughts regarding the nature of the scientific evidence surrounding climate change?
Exploratory questions	Do you feel empowered to do anything about climate change? What are your impressions of the media representation of the issue of climate change?

Analysis

Following the elicitation interviews, all interviews were transcribed verbatim and reviewed for quality control. Data from the elicitation study was analysed using thematic content analysis (Braun & Clarke, 2013). Coding of responses to each question was performed using NVivo version 10 software. Common responses and themes to the interview questions are shown in Table 4.

Results and Discussion

Table 4 (below) shows the commonly elicited responses from interviews with participants, grouped according to relevant constructs and the proportion of participants who provided a response coded within this theme.

Table 4 Elicited responses in order of commonality for each relevant construct, and percent of participants responding with these responses

Theme	Subtheme	Responses	% of participants
Climate Change v. Global Warming	Climate Change	Increase/change in temperature	50%
		Carbon emissions	35%
		Global warming	25%
		Environmental disasters (e.g. floods, droughts, bushfires)	20%
		Melting ice caps	15%
		Greenhouse gases	15%
	Global Warming	Increase/change in temperature	25%
		A part of climate change	20%

Theme	Subtheme	Responses	% of participants
Climate change	Belief	Less “accurate” than climate change	15%
		Greenhouse gases/effect	15%
		Definitely occurring	70%
		Probably occurring	5%
		Ambivalent	10%
		Sceptical	15%
		Definitely not occurring	0%
	Experiences	Hotter summers	40%
		Extreme weather	20%
		Environmental disasters	20%
		Shifting of seasons	10%
Causes	Types	None	30%
		Carbon emissions/pollution	90%
		Deforestation	25%
		Resource consumption	25%
		Methane	10%
		Natural climate fluctuations	15%
	Extent of human involvement	Majority humans/exacerbated natural process	70%
		Only humans	10%
		Mostly natural	5%
		Completely natural	5%

Theme	Subtheme	Responses	% of participants
Consequences		Unsure	5%
		Rising sea levels	35%
		Reduction in habitable areas	20%
		Food supply effects	15%
		Ecosystem damage	10%
		Extreme weather	10%
		Environmental disasters	10%
		Yes, nonspecific	15%
Scientific evidence		None, or no immediate effects	15%
		Strong consensus	65%
		Still debated	5%
		Exaggerated	5%
		Sceptical	5%
		Ambivalent	5%
		Unsure	10%

Understanding of Climate Change and Global Warming

Some participants believed these two concepts were more or less referring to the same issue, global warming being “pretty much the same thing” as climate change. However, many also saw global warming as a part of climate change, or a “less accurate” way to describe the same phenomena, citing that variance in temperature occurs in both directions rather than just warming.

Participants typically mentioned concepts relating to the effects of climate change. Rising temperatures were cited in discussions around both climate change and global warming, although climate change appeared to elicit more references to adverse consequences, such as “melting ice caps” and “bushfires”. With respect to potential causal factors, participants often thought of “carbon emissions” and “greenhouse gases” when thinking about climate change, and “greenhouse gases” with respect to global warming. However, participants were more forthcoming in general while considering climate change than when considering global warming, although it is possible that this was due to the effect of question ordering. Participants had already had the opportunity to mention these concepts with respect to climate change, so some may have felt as though they needed to respond to the global warming question with respect to their response to the previous climate change question, rather than focusing on global warming independently. In support of this, 15% of participants characterised global warming as a less accurate description of the phenomenon, or a term that is imprecise and superseded by a more accurate description in climate change and 20% thought global warming was a part of a broader climate change phenomenon. This would appear to indicate that opting to use the term “climate change” in measurement items is preferable, as it is a term that individuals may more readily identify as the proper and precise label for the phenomenon.

Climate Change Beliefs – Existence, Causes, Impacts

While most participants believed in the existence of climate change, there was less consensus within the cohort regarding the causes of climate change (and in particular the level of human involvement), as well as the resulting impacts. The next subsections will discuss the findings with respect to perceived causes of, and impacts of, climate change.

Causes of Climate Change and Extent of Human Involvement

The overwhelming majority of participants identified carbon emissions and the burning of fossil fuels as a major cause of climate change. Most participants acknowledged that climate change is a natural occurrence, although they typically noted that humans have exacerbated the change through the use of fossil fuels. One participant indicated that they believed climate change was a mostly natural occurrence with some human involvement, while another believed that it was entirely naturally-caused. Finally, one participant expressed uncertainty as to the causes of climate change.

Few participants explicitly described the link between fossil fuel emissions and climate change. While most appeared to understand that increases in these emissions lead to increases in climate change, only a small number of participants made the further step to describe the process by which these emissions lead to increasing temperatures and climate change. While it is possible that participants simply did not include the extra step of explaining causation even though they are aware of it, it is also possible that they only understand the relationship between carbon emissions and climate change at a general level. That is, the use of fossil fuels (or the increase in carbon emissions) somehow results in an increase in climate change, without understanding the processes by which these occur. This suggests that any items based on specific knowledge about climate change causes to measure belief in anthropogenic climate change could be problematic.

Consequences of Climate Change

The question relating to participants beliefs regarding the consequences of climate change drew the highest level of disagreement and differentiation in opinion, ranging from “climate change is already causing issues” to beliefs that “claims are exaggerated” or that effects would not be felt for a very long time. Most participants (85%) believed that climate

change will cause extreme consequences for the planet and for humanity, citing events such as increased heat, drought, famines, floods and the submerging of low-lying areas. Some of these participants believed that climate change is already having a serious impact on the environment. Twenty percent of participants felt that the consequences will not be as bad as scientists or the media are suggesting. Two participants thought that while the consequences are potentially catastrophic, humans will “find a way to adapt”. Some admitted that they simply did not know whether climate change is likely to bring about serious consequences for humanity and for planet Earth. Fifteen percent showed low concern, and even disbelief in the possibility of catastrophic consequences.

Some participants acknowledged a level of personal ignorance on the issue. Those that did were less in line with the scientific consensus, believing that while anthropogenic climate change is plausible, that its effects are exaggerated.

“I guess because there is a lot of scare-mongering I don't really know like to what extent to believe how bad the situation actually is. Because I don't read a lot about it, so I don't, I don't really know what all the scientists are saying as such, but I just umm, I just sort of think yeah if we don't make changes then it possibly will have dire consequences that, I don't know, I'm not sure if it will get to that point.”

The varied responses to this question demonstrate the need for a multi-item scale that measures beliefs about the existence of climate change, anthropogenic climate change, and climate change impact as separate factors. While most participants were of the opinion that climate change is occurring, there was less agreement regarding its impacts, suggesting that measuring only belief in climate change occurrence would overestimate population consensus on the issue.

Personal Experience of Climate Change

Participants were generally unsure about whether they had experienced any weather or environmental phenomena related to climate change. Some said that it is not possible to have a personal experience of climate change due to climate change being a subtle and long-term change. When participants offered possibilities of related experiences, hotter weather was most common. Bushfires, droughts, and the recent Typhoon Haiyan in the Philippines were also mentioned (n.b. these are listed under the category of “environmental disasters” in Table 4).

Although some participants were willing to draw the possible causal link between a tangible phenomenon such as a drought or a bushfire, it appeared that participants were cautious in their approach to this question. This may be due to a reluctance to draw inferences between climate change and personally-experienced phenomena due to a level of uncertainty. In particular, given that the sample was relatively highly educated, there might be a tendency to avoid drawing causal links to particular phenomena without a higher standard of evidence. With respect to questionnaire item development, this may suggest that avoiding specific mentions of climate change-related phenomena is advisable given the range of responses and the possibility of healthy scientifically-minded scepticism regarding links between specific and tangible weather events such as droughts, bushfires and floods, and the predicted increase in such weather events in climate change models.

Impressions of Scientific Research and Debate

Most participants admitted to a level of ignorance with respect to the detail of the scientific research and claims surrounding climate change. However, most appeared to trust the science, if not explicitly, then implicitly through their belief in anthropogenic climate change. Most appeared to understand that there is little debate amongst scientists regarding

the human role in climate change, although those who were more sceptical of climate change, and anthropogenic climate change in particular, were of the view that the climate change debate was not settled among scientists.

Key Considerations for Scale Development

The findings highlighted above lead to three important recommendations for the development of a climate change denial scale. These include:

- **Use the term “climate change” instead of “global warming”** - Given that some participants saw global warming as a component of climate change, and a less accurate descriptor of the phenomenon, the term “climate change” appears more suitable to use, and any questionnaire should consistently adopt this terminology. This is also consistent with the technical definitions of this term where climate change encapsulates the consequences of rising temperatures (global warming).
- **Avoid Knowledge-Based Items** - Although participants could identify that fossil fuel use and carbon emissions are major factors in the cause of climate change, few participants explicitly identified the mechanisms that connect the two. As a result, scales should avoid using knowledge about the mechanisms underlying climate change as an indicator of belief in climate change.
- **Create Climate Change Denial Sub-factors** - Not all participants believed that humans contribute to the phenomenon of rising temperatures, while some believed that climate change is a term that implies a phenomenon caused by humans. Furthermore, there were mixed reactions with respect to the impacts of climate change and perceived risk. This would appear to suggest that only asking about the existence of climate change is likely to result in misleading outcomes that are difficult

to meaningfully interpret. A multifactorial measure of climate change denial is therefore required.

Chapter Four: Study Two – Climate Change Denial Questionnaire Development and Pilot Testing

After the completion of the elicitation study described in the previous chapter, a study reporting the use of a new climate change denial scale was published (Häkkinen & Akrami, 2014). This scale appeared to address the considerations raised via the findings of the elicitation study (see items in Table 5, page 35). It used the term “climate change” as opposed to “global warming”, and did so consistently without switching between the terms. The wording of the items did not rely on technical knowledge on the part of the participant, except for the most general concepts (for instance, general increase in temperature as an effect of climate change). Finally, the scale appeared to be suitable for use as a multifactorial measure of climate change denial. It includes items pertaining to denial of the existence of climate change, denial of human cause of climate change, denial of climate change impacts, and additionally denial of science and scientific evidence for climate change. However, this measure was initially written in Swedish, and so a pilot study was conducted of the English translation² for use in the third study of this thesis; data for this study was collected in 2015.

Aim

The aim of the pilot study was to examine item variance, interfactor correlations, and scale reliability of the English translation of the climate change denial scale (Häkkinen & Akrami, 2014).

² We are appreciative to Kirsti Jhyla (née Häkkinen) for giving us access to a preliminary translated version of the scale

Method

Participants

A total of 67 participants completed all items in the pilot study. Participants were aged between 18 and 75 years ($M_{age} = 30.90$, $SD = 12.95$) and indicated their gender as female ($n=46$), male ($n=20$) or other ($n=1$). The number of participants in this study is in excess of the recommended minimum of 30 participants for pilot studies with the intention of measurement development, and to obtain internal consistency statistics (Johanson & Brooks, 2010). These participants were recruited via social media platform Facebook.

Materials

Climate Change Denial Scale (See Table 5 for pilot study scale items) was a scale designed by Häkkinen and Akrami (2014) to capture different forms of denial. The original scale included 20 items, however one item was removed prior to pilot testing within this study. That item (“The temperature on Earth varies naturally”) was removed due to concerns about its specific wording and the possibility that it would be a poor discriminator between deniers and those who accept anthropogenic climate change. It is possible that believers would agree with the statement at similar levels to deniers, as it is accurate to suggest that there are natural fluctuations in temperatures. It was felt that the wording of this item was not specific enough and too ambiguous.

The scale consists of four subscales: existence denial, human cause denial, impact denial, and science denial.

Analyses Conducted

Item means and standard deviations were obtained and reliability analysis was conducted using SPSS Statistics Version 22. The aim of obtaining these statistics was to

examine floor and ceiling effects in the items, variance in each item (means and standard deviations), and overall scale reliability (Cronbach's α).

Results and Discussion

Item Statistics

Table 5 includes the means and standard deviations for all items within the Climate Change Denial scale after reverse coding of relevant items. Means for all items are below the mid-point of the scale, however some items showed relatively large variance. Low scores on a climate change denial scale should be unsurprising given that the majority of the population do not deny anthropogenic climate change.

Table 5 Means and Standard Deviations for items in Climate Change Denial Scale

Item Number	Item	Mean	SD
1	I am not convinced that the Earth's climate has warmed up over the last century.	2.04	1.63
2	I find it hard to believe that the Earth's climate is really changing.	1.51	.98
3	My opinion is that Earth's climate shows a pronounced increase in temperature.*	2.45	1.51
4	I believe that climate change is occurring.*	1.61	1.01
5	Climate change is a result of human activities such as burning fossil fuels.*	2.00	1.18
6	Climate change is just a result of natural variation in the climate.	3.21	1.52
7	Warming of the climate on Earth is not due to human influence.	1.79	.95
8	Human activity is causing changes in the climate.*	1.76	.96
9	Climate change will affect the Earth negatively.*	2.01	1.32
10	Climate change will not affect life on Earth in any significant way.	1.63	.97
11	My opinion is that we will not even notice the effects of climate change.	1.63	.94
12	The so-called "climate threat" is exaggerated.	2.04	1.39
13	The seriousness of climate change is exaggerated in the media.	2.18	1.52
14	A few degrees here or there in climate change will not affect life on Earth.	1.87	1.19
15	Many people underestimate the seriousness of climate change.*	2.10	1.36
16	I do not believe that scientists are in agreement on the issue of climate change.	3.12	2.02
17	I believe that there is enough scientific evidence to confirm the changes in Earth's climate.*	1.84	1.14
18	I think the evidence for climate change is far too weak.	1.94	1.19
19	Scientific evidence overwhelmingly supports the notion that the climate is changing.*	2.10	1.26

Note: * indicates the item was reverse coded. All items range from 1 (strongly disagree) to 7 (strongly agree).

Table 6 Inter-item correlations for the Climate Change Denial Scale

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
2	.50*																	
3	.16	.50*																
4	.43*	.92*	.53*															
5	.24*	.59*	.36*	.70*														
6	.25*	.40*	.43*	.45*	.58*													
7	.24*	.54*	.26*	.61*	.73*	.54*												
8	.22	.51*	.25*	.65*	.82*	.56*	.80*											
9	.19	.35*	.16	.37*	.63*	.52*	.46*	.59*										
10	.35*	.62*	.31*	.67*	.48*	.35*	.54*	.62*	.47*									
11	.29*	.53*	.25*	.64*	.63*	.42*	.66*	.76*	.52*	.83*								
12	.28*	.60*	.36*	.71*	.69*	.52*	.57*	.66*	.44*	.65*	.77*							
13	.32*	.61*	.39*	.71*	.63*	.51*	.57*	.67*	.45*	.72*	.75*	.86*						
14	.18	.52*	.25*	.58*	.54*	.36*	.55*	.58*	.39*	.72*	.76*	.66*	.70*					
15	.37*	.60*	.32*	.63*	.51*	.39*	.48*	.49*	.34*	.48*	.51*	.64*	.62*	.51*				
16	.06	.38*	.21	.42*	.48*	.31*	.30*	.36*	.22	.26*	.31*	.45*	.34*	.33*	.20			
17	.28	.73*	.52*	.83*	.66*	.46*	.50*	.66*	.40*	.58*	.60*	.65*	.59*	.51*	.51*	.50*		
18	.31	.76*	.50*	.85*	.65*	.42*	.54*	.64*	.31*	.59*	.62*	.65*	.63*	.53*	.51*	.57*	.85*	
19	.21	.64*	.42*	.73*	.67*	.45*	.57*	.65*	.41*	.51*	.58*	.56*	.54*	.44*	.45*	.54*	.84*	.88*

Note. * $p < .05$

Subscale statistics

The means, standard deviations, Cronbach's alphas, and interfactor-correlations for all subscales are reported in Table 7.

Table 7 Bivariate correlations, means, standard deviations and Cronbach's alphas for the Climate Change Denial scale and subscales

	1	2	3	4	M	SD	α	Items
1. Total scale					2.04	.90	.94	1-19
2. Existence Denial Subscale	.81				1.90	.99	.75	1-4
3. Human Cause Denial Subscale	.87	.58			2.19	.99	.87	5-8
4. Impact Denial Subscale	.92	.64	.77		1.92	1.01	.91	9-15
5. Science Denial Subscale	.84	.62	.66	.64	2.25	1.21	.86	16-19

Note. All correlations significant at $p < .05$

Cronbach's alphas for total scale and all subscales indicate good inter-item reliability. The subscale correlations suggest that while they are positively related and strongly correlated (as expected), they are still distinct constructs. This offers preliminary support for the scale's use as a multifactorial measure of climate change denial. However, to confirm this, a confirmatory factor analysis was conducted as part of statistical analyses conducted in Study Four (see Chapter Seven).

Changes Made to Climate Change Denial Scale for Study Four

Some items in the original Climate Change Denial scale were changed or removed based in part on the findings from this study. As such, items 10, 13, and 15 were omitted, and the wording of item 14 was changed to omit mention of "degrees" alluding to temperature change so as to adhere to earlier concerns regarding knowledge of climate change.

Item 10 "Climate change will not affect the life on Earth in any significant way" was omitted due to a large correlation with item 11 ($r = .83$). Item 11 "My opinion is that we will

not even notice the effects of climate change” was favoured as it did not specify the effects of climate change, allowing more scope for the participant to consider possible climate change impacts. Item 10 narrowed the field of impacts to “life on Earth”, which perhaps reduces considerations to climate change impacts humans, animal species and the natural environment, which while broad and important in and of itself, does not allow for the possibility of participants viewing climate change as impacting on society, economics and other human systems.

Item 13, “The seriousness of climate change is exaggerated in the media” was removed due to its focus on perceptions of the media coverage of climate change, which while interesting and valuable, was not the direct focus of the final study, and was the only item in the original scale mentioning media.

Item 15 “Many people underestimate the seriousness of climate change (reverse-coded)” focuses on participant’s perceptions of other people’s level of climate change impact denial rather than their own. As this item was the only item to do so, it was removed to keep the focus of items on participant’s personal beliefs.

Conclusion

Findings from this pilot study broadly support the continued use of the scale as a multifactorial measure of existence denial, human cause denial, impact denial, and science denial. As mentioned above, some changes were made to the finalised scale to be used in Study Four. This finalised scale can be found in Appendix D.4 in Study Four Questionnaire Materials.

Chapter Five: A System Justification Theory Approach to Ideology and Climate Change Denial

Chapter Summary

The aim of this chapter is to advance a System Justification Theory approach to understanding the right-wing tendency to deny climate change. In doing so, I will first summarise findings that right-wing ideological adherents are more likely to deny climate change than their left-wing counterparts, and that ideology moderates other variables that are otherwise thought to counteract denial such as level of education and understanding of climate change. Through this, two key issues emerging from the literature on the ideology-climate change denial relationship are highlighted: the need for a nuanced approach to ideology; and the limited understanding of what drives this relationship based on existing theory and empirical literature.

By way of exploring the first issue, existing conceptualisations of ideology are described along with the issues and inadequacies with the common unidimensional conceptualisation of ideology. Through this, I propose the application of a multidimensional ideological model: the Dual Process Model of Ideology (Duckitt & Sibley, 2009). I argue that applying this model will improve our understanding of the underlying ideological drivers for climate change denial.

To address the second issue, I propose that the ideology-climate change denial relationship might be explained by a tendency to perceive climate change mitigation as a threat to the socioeconomic system. This is referred to as the Mitigation Threat Hypothesis throughout. The Mitigation Threat Hypothesis is developed from System Justification Theory, which predicts that individuals, and right-wing adherents in particular, are more likely to engage in behaviours and beliefs that protect the system when they perceive a threat

to it. From this, existing evidence for the role of perceived system threat in system-justifying behaviours generally is appraised, as well as evidence supporting the Mitigation Threat Hypothesis itself. Finally, the rationale for two further studies that seek to address limitations in the literature by: (1) testing the System Justification Theory claim that threats to the system drive the system justification tendency in right-wing adherents; and (2) testing the Mitigation Threat Hypothesis.

The Role of Ideology in Climate Change Denial

Extensive research has investigated the determinants and correlates of climate change denial. A recent meta-analysis by Hornsey, Harris, Bain & Fielding (2016) summarised this body of research and identified a number of demographic factors that predict higher levels of climate change denial:

- Male gender
- Increased age
- Lower income
- Lower education level
- White ethnicity
- Right-wing political party affiliation
- Conservative ideological orientation

Of these, political affiliation (self-reported affiliation with a political party) and ideology (typically self-reported on single dimension liberal/conservative) were the two strongest demographic predictors of climate change denial (Hornsey et al., 2016). In addition, the meta-analysis identified a number of important psychological predictors (or antecedents) of climate change denial. These included:

- Objective and subjective climate change knowledge
- Trust in scientists
- Perceived scientific consensus
- New Ecological Paradigm
- Activist/green identity

- Biospheric values
- Individualistic and hierarchical cultural values
- Free-market ideology
- Experience of extreme weather
- Experience of local weather change
- Environmental cues

Importantly, other studies have found that political affiliation and ideology not only correlate with climate change beliefs, but also moderate the influence of other significant demographic and psychological variables. For example, political affiliation moderates the relationship between educational attainment and climate change beliefs (Hamilton, 2011). More educated Republicans show the same or lower levels of climate change concern than less educated Republicans, whereas the relationship between education and concern is positive for Democrats with climate change concern increasing as education increases (Hamilton, 2011; Hamilton et al., 2015).

Highlighting the importance of political variables in understanding climate change denial, variables that generally decrease level of denial, such as climate change knowledge (Malka, Krosnick, & Langer, 2009), general science knowledge (Hamilton, Cutler, & Schaefer, 2012), science literacy (Kahan et al., 2012), and climate change consensus information (Cook & Lewandowsky, 2016) only do so for liberals and Democrats. These variables have no effect on levels of denial for conservatives and Republicans, and in some cases actually increase levels of denial for these right-wing adherents. This is of significant concern to climate scientists, science communicators and environmental advocates, who may believe that presenting climate sceptics and deniers with scientific facts about climate change will result in an increase in belief and concern about climate change. These findings stress the importance of the need to understand the underlying factors involved in right-wing denial of climate change.

Overall, many determinants of climate change denial are implicitly or explicitly linked to ideology, and many of these predictors appear to operate differently for left-wing party affiliates compared to right-wing party affiliates, and liberals compared to conservatives. It is important to note that, despite evidence of partisan influences on climate change denial, ideology appears to be a more appropriate variable to investigate than simple party allegiance.

Firstly, party affiliation differs across nations, and conclusions drawn about Republicans and Democrats are not necessarily amenable to application in other national political contexts. Although most developed democracies have major centre-right and centre-left parties, the political contexts differ such that seemingly comparable parties differ in their ideological focus, and may be more or less conservative or liberal than a similar party from another nation. For example, centre-right parties in Australia, France and the United Kingdom support, to varying levels, centre-left policy initiatives such as paid maternity leave and basic universal healthcare, which puts them at odds with their centre-right counterparts in the United States. On the other hand, ideology is cross-culturally and temporally superior in that it is not as bound by cultural, political, or temporal context in the same way that political parties are. Ideological values are represented across cultural and political contexts (Krauss, 2006; Van Hiel & Kossowska, 2007), and the concept of left-wing and right-wing ideological positions have been represented for some two-hundred years (Jost, Nosek, & Gosling, 2008) making ideological variables more generalizable across time.

Secondly, party identification (defined as “a long term, affective, psychological identification with one’s preferred political party”, p. 2) is declining in many democratic nations (Dalton, 2016), meaning that focusing only on party identifiers excludes a growing proportion of the population that identifies as independent. Unlike party identification, ideological polarisation is increasing rather than in decline (Pew Research Center, 2014). To

add to this, there are psychological effects that are specific to partisans and not present in non-partisans, such as partisan motivated reasoning effects (Taber & Lodge, 2006), that may affect their attitudes in other political or scientific domains in ways that are not found in non-partisans (Dalton, 2016).

Taken together, this body of research suggests that political ideology is worthy of further investigation with respect to its role in climate change denial. As such, this chapter will focus on the role of ideology, how it has been examined in climate change denial research, and whether a new approach to ideology will help us further understand climate change denial.

Conceptualisations of Ideology

Ideology is a complex concept that appears to have several different definitions and understandings that differ both between and within social science disciplines (Gerring, 1997). Providing a detailed discussion of these definitions is not within the scope of this thesis, however it is important to outline the approach that will be taken, and what aspects of ideology will and will not be included in this body of work. This thesis will apply a conceptualisation of political ideology that is common in social and political psychology research, which views it dimensionally (i.e. left-right) and as a function of roughly coherent social and economic political beliefs held by the individual. This is in line with definitions offered by political scientists such as Heywood (2012) who defines ideology as “a more or less coherent set of ideas that provides the basis for organised political action, whether this is intended to preserve, modify or overthrow the existing system of power” (p. 11). Similarly, Converse (1964) defined it as “a configuration of ideas and attitudes in which the elements are bound together by some form of constraint or functional interdependence” (p. 207). While these definitions of ideology encapsulate both “classical” ideological traditions (e.g. liberalism, conservatism, and socialism) and “new” ideologies (e.g. feminism, religious

fundamentalism, and ecologism; Heywood, 2012), the focus of this thesis will be on the relationship between classical ideological positions and climate change denial.

Dimensionality of Ideology

As mentioned, most studies linking climate change denial to political ideology conceptualise ideology as a unidimensional construct ranging from left to right (or liberal to conservative) on the political spectrum (See Figure 2). Liberal or left-wing adherents typically value equality, social justice (Feldman, 2013) and individual freedom (Freedman & Stears, 2013). Conservative or right-wing adherents on the other hand tend to value tradition, hierarchical social structures, and unequal distributions of power (Feldman, 2013; Jost, Federico, & Napier, 2009). Proponents of the unidimensional approach argue that it is parsimonious (e.g. Jost et al., 2009) and that multidimensional models are only disentangling two dimensions (social and economic conservatism) that are interrelated and share common psychological antecedents, such as higher levels of uncertainty and threat (Jost, Glaser, Kruglanski, & Sulloway, 2003). However, evidence from political psychology research suggests that the unidimensional approach fundamentally misrepresents ideology (Feldman, 2013) and as such undermines research into its relationship with climate change denial. The following subsections will outline the issues with the unidimensional approach; examine evidence supporting the use of a multidimensional conceptualisation of ideology; and discuss studies into climate change denial that have operationalised ideology in two dimensions.

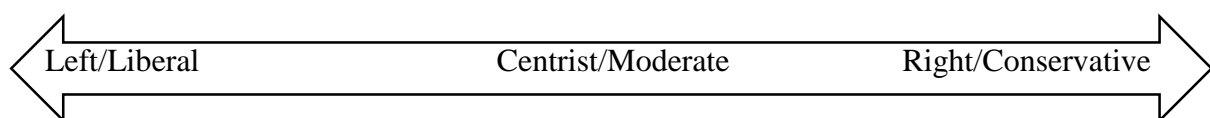


Figure 2 Unidimensional model of ideology

Problems with the Unidimensional Approach

Although widely used and appealing in its simplicity, this unidimensional approach is problematic for a number of important reasons. This subsection will identify some key limitations of this approach.

Firstly, studies examining the dimensionality of political beliefs show that the left-right unidimensional model is flawed and lacks empirical support. As Feldman notes, “A large number of studies, spanning well over 50 years, have examined the dimensionality of political beliefs and issue preferences among people in many different countries. In virtually no case is a single factor (left-right) model an adequate fit to the data” (2013, p. 595). In sum, psychological antecedents differentially predict social and economic preferences (Feldman, 2013), suggesting that these ideological dimensions are psychologically distinct (n.b. the extent to which a multidimensional approach to ideology resolves this issue is discussed in more detail below).

A related issue is that the meaning of “moderate” on a unidimensional scale is ambiguous. Research suggests that those who self-identify as moderate on such measures are not exclusively centrists, but also individuals with a combination of equally extreme, but counterpoised liberal and conservative views (Klar, 2014; Treier & Hillygus, 2009). As a result the unidimensional scale is unable to separate true moderates from individuals such as libertarians. Indeed, it is not uncommon for individuals to adopt right-wing economic attitudes along with left-wing social attitudes (in the case of libertarians), and vice versa (Feldman & Johnston, 2013), which means that it is difficult for individuals to place themselves on a unidimensional ideology scale.

Use of these types of unidimensional self-placement measures of ideology also ignores the evidence that the terms used as anchors (namely conservative/liberal) are

themselves value-laden. This could lead individuals to avoid identification with a particular ideology due to perceived negative connotations, despite possibly holding attitudes and values congruent with that ideology (Ellis & Stimson, 2012). For example, Schiffer has argued that individuals who identify as conservative Democrats appear to have values that are more liberal than they indicate themselves to be when using self-placement items. He has suggested that this apparent inconsistency may arise out of reluctance to self-identify as “liberal” due to the often derogatory use of that term during and after the Reagan years (Schiffer, 2000). This apparent inconsistency can also arise due to inconsistent understanding of ideological labels. People may identify with conservatism and liberalism but differ on their understandings of these concepts with respect to policy content (Feldman & Johnston, 2013); There is evidence that some may identify as conservative despite supporting liberal positions (Zell & Bernstein, 2013).

Another complication of the unidimensional model is the inconsistency of ideological beliefs domains across levels of political sophistication (Converse, 1964). Only politically sophisticated partisans, or individuals who are highly politically engaged and with high political knowledge, tend to coherently polarise along the liberal-conservative continuum (Feldman & Johnston, 2013). The relationship between economic and social ideological domains increases as sophistication increases (Feldman & Johnston, 2013). Therefore, the unidimensional approach may not be appropriate for those low in sophistication, and according to Converse (1964) this accounts for the vast majority of the voting population.

Indeed, it is these limitations that led Feldman to argue that “Although politicians, philosophers, and social scientists often discuss politics as if it were organized on a single left-right dimension, 50 years of research on public opinion shows that a unidimensional model of ideology is a poor description of political attitudes for the overwhelming proportion of people virtually everywhere” (Feldman, 2003, p.477). Consideration of the limitations of

unidimensional approaches to understanding and measuring ideology has led political and social psychologists to recommend the use of multidimensional models of ideology.

Multidimensional Models

Multidimensional models of ideology conceptualise ideology as made up of multiple distinct, but often related, dimensions – typically with one dimension representing economic equality, preference for hierarchy, and self-interest (economic ideology), and a second referring to a preference for tradition, social order above social change, and individual freedom (social ideology; Feldman, 2013). Figure 3 provides a graphical representation of this multidimensional ideological space. For example, Jost et al., (2003) defines conservative ideology as constituting high levels of both resistance to change and acceptance of inequality. Resistance to change refers to preferences for traditionalism and an opposition to challenges to the existing social, cultural and political order (Jost et al., 2003), and is conceptually similar to the conservative end of social ideology. Acceptance of inequality refers to the perception that hierarchy is inevitable in society (Jost et al., 2003) and is conceptually similar to the conservative end of economic ideology.

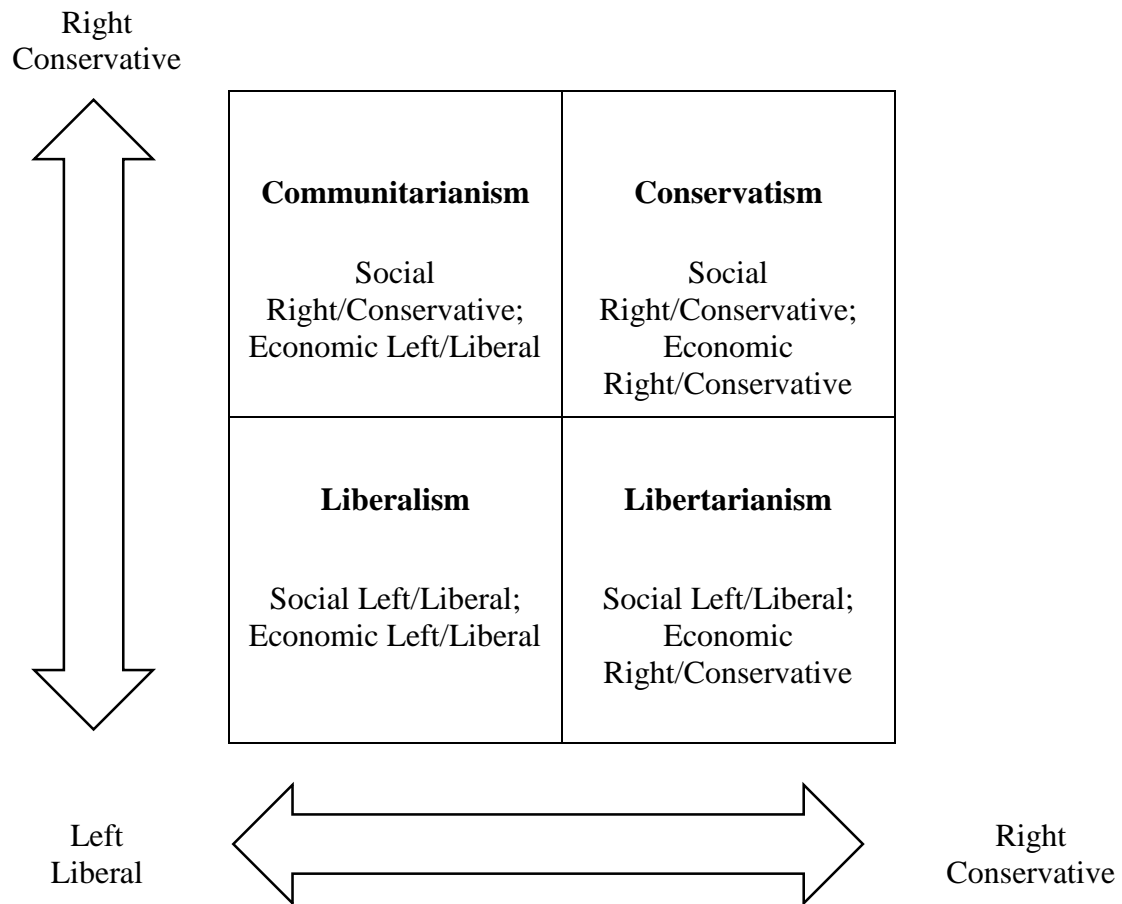


Figure 3 Ideology matrix representing two ideological dimensions of political ideology (economic on horizontal axis and social on vertical axis).

This thesis will adopt the Dual Process Model (DPM) of ideology, which is a multidimensional model that operationalises social ideology (resistance to change) as Right-Wing Authoritarianism (RWA), and economic ideology (acceptance of inequality) as Social Dominance Orientation (SDO) (Duckitt, 2001; Duckitt & Sibley, 2009), and views these variables as representing relatively distinct ideological attitude dimensions (Duckitt & Sibley, 2009). RWA represents an individual's tendency to submit to authority, a tendency to commitment to norms and conventions of society, and a preference for authority to punish deviants and norm violators (Altemeyer, 1998). SDO represents a preference for inequality,

intergroup hierarchy and group dominance (Ho et al., 2015; Pratto, Sidanius, Stallworth, & Malle, 1994). RWA and SDO have been respectively shown to be strongly correlated with other indices of social and economic ideological dimensions (Caprara & Vecchione, 2013).

Psychological Distinctiveness of the Two Ideological Dimensions

The DPM posits that SDO and RWA are founded in different core beliefs about the social world. Those high in SDO tend to see the world as a ‘competitive jungle’ while those high in RWA tend to see the world as a ‘dangerous place’ (Duckitt & Sibley, 2009). A recent meta-analysis supported this contention, demonstrating divergent correlations with these types of beliefs; Dangerous worldview beliefs were more strongly related to RWA ($r=.41$) than SDO ($r=.17$) whereas the reverse was true for competitive worldview beliefs, such that it was correlated with SDO at .55 and RWA at .19 (Perry, Sibley, & Duckitt, 2013). This evidence for the DPM argument that these ideological dimensions may arise from different core beliefs about the social world, provides impetus to treat these as different psychological constructs.

Additionally, RWA and SDO have different associations with key personality traits. For example, in a large New Zealand sample ($N=6,886$) Big Five personality trait agreeableness was significantly and negatively related to SDO ($r = -.32$) but not RWA. The authors explain that people with low levels of trait agreeableness are more likely to be self-interested and hedonistic, and have a heightened sensitivity to competitive situations (Perry & Sibley, 2013). Trait conscientiousness (a trait representing levels of organisation, dependability, reliability, and thoroughness; Goldberg, 1993) significantly and positively related to RWA ($r = .14$) but not SDO (Perry & Sibley, 2013). Findings from an earlier meta-analysis by Sibley and Duckitt (2008) are consistent with this pattern of findings, with agreeableness negatively correlated with SDO (ranging from $-.26$ to $-.38$ depending on the

Big Five scale used) but not RWA, and conscientiousness positively correlated with RWA (.10 to .19) but not SDO.

Further supporting the psychological distinctiveness of RWA and SDO, the two ideological variables differentially map on to values from the Schwartz Value Survey (Schwartz, 1992). Values are defined as general or abstract beliefs that serve as guiding principles for individuals (Feather & McKee, 2012). RWA is positively related to an array of values emphasising tradition (respect for customs and ideas provided by the traditional culture), conformity (adherence to social norms and the restraint in behaviours likely to violate them), and security (safety, harmony, stability of society). By contrast, while SDO is also positively related to security, it differs in that it is positively correlated with values of power (social status, prestige, dominance over others and resources), achievement (personal success through demonstration of competence according to social standards), and hedonism (pleasure and self-indulgence), which are largely uncorrelated to RWA (Feather & McKee, 2012).

These political ideology dimensions have also been mapped on to moral foundations. Moral Foundations Theory proposes five universal moral foundations that are grouped into two superordinate categories of morality; individualising foundations, which relate to more traditional concepts of morality such as social justice, and are captured by harm/care and fairness/reciprocity dimensions; and binding foundations, which work to maintain in-group relations, such as in-group/loyalty, authority/respect, and purity/sanctity (Haidt & Graham, 2007). RWA is positively associated to the binding foundations and unrelated to the individualising foundations. SDO, however, is negatively related to individualising foundations and only weakly (although positively) related to the binding set (Milojev et al., 2014).

In sum, as well as distinguishing between the conventional left-right spectrum, RWA and SDO are underpinned by different sets of personality and values variables that highlight their distinctiveness as ideological dimensions. Those high in RWA are likely to be high in personality trait conscientiousness, and they value tradition, conformity, security, authority, and in-group loyalty, and view the world as a dangerous place. On the other hand, those high in SDO are likely to view the world as a competitive jungle, have lower trait agreeableness, are more likely to be self-interested and hedonistic. They also value power, social status, personal achievement, and have lower levels of moral concern regarding social justice. These personality and values differences between the two ideological variables highlights the need for the use of multidimensional models such as the DPM over unidimensional models that are unable to capture the unique variance underpinning conservative ideology.

Utility of a Multidimensional Ideological Approach

Multidimensional models such as the DPM are advantageous as they adequately solve the issues of the unidimensional approach discussed above. They can be used to characterise ideological positions that exist on the more simplistic left/right unidimensional model but can also account for other ideological positions that are mischaracterised within this unidimensional approach, such as libertarianism and communitarianism (Feldman, 2013; Klar, 2014; Swedlow, 2008). They avoid the issue of so-called cross-pressured individuals responding as moderate when they may in fact be extreme on both social and economic dimensions but in opposite directions (Treier & Hillygus, 2009). For instance, libertarian ideology can be characterised as having high levels of economic conservatism but low levels of social conservatism, and due to this a libertarian would find it difficult to place themselves meaningfully along a unidimensional continuum (as previously argued).

Importantly, multidimensional models of ideology also accommodate for cross-cultural differences in ideology. Although it is typical to find that the two dimensions positively correlate in Western democracies, ideological research in Eastern European and post-communist nations find that the two dimensions are sometimes negatively correlated (Van Hiel & Kossowska, 2007). This suggests that normative ideological alignment in these nations is different to Western nations, and highlights the importance of socio-political context in the formation of ideology (de Regt, Mortelmans, & Smits, 2011). Importantly in the context of climate change, cross-cultural differences in the meaning of left-right identification suggest that an understanding of climate change denial outside of Western political contexts is made difficult without a multidimensional approach. McCright, Dunlap and Marquart-Pyatt (2016) found no left-right ideological divide with respect to belief in climate change and support for mitigation in eleven former communist countries sampled, which they attribute to differences in the meaning of left-right identification in the post-communist context.

Use of Dual Process Model in CCD Research

In addition to the concerns raised regarding the unidimensional model, as well as the established benefits of adopting a multidimensional approach, the DPM appears to be a particularly useful conceptualisation of ideology to assist in identifying the underlying ideological motivators to climate change denial. The DPM asserts that while high RWA and high SDO will often result in the same political outcomes, the underlying motivations for these outcomes will differ (Duckitt & Sibley, 2009). For example, both high RWA and high SDO may predict support for right-wing political parties or policies. Those high in RWA may be drawn to such a political party or policies as a way to serve needs relating to traditionalism, conventionalism and social conservatism. Whereas, those high in SDO might be drawn to the same party/policies due to their attraction to economically conservative

policy positions and a tendency to prefer group inequality. The ability to distinguish between different underlying motives for political positions may be useful in the context of climate change denial to allow a nuanced understanding of why different types of right-wing adherents will engage in denial. Even if both RWA and SDO positively and uniquely predict variance in climate change denial outcomes, they may do so for different reasons.

Indeed, studies have found that RWA and SDO are significant ideological predictors of climate change denial (Häkkinen & Akrami, 2014; Hoffarth & Hodson, 2016; Milfont, Richter, Sibley, Wilson, & Fischer, 2013; Stanley, Wilson, & Milfont, 2017), and despite being correlated, often predict variance in denial over and above one another, at least in Western contexts. Although SDO was the only significant predictor of climate change denial out of the two ideological variables in one study (Häkkinen & Akrami, 2014), both SDO and RWA have been shown to uniquely explain variance in climate change denial (Milfont et al., 2013). RWA and SDO were also independent predictors of denial through an environmentalist threat mediator (that is, perceived threat to society, tradition, and the economy posed by environmentalists; Hoffarth & Hodson, 2016). In sum, the findings regarding the contributions of RWA and SDO could suggest the possibility of different right-wing ideological pathways to climate change denial, highlighting the merit in the continued examination of the effects of the two ideological paths of the multidimensional model on climate change denial.

The Mitigation Threat Hypothesis – System Justification Theory

While evidence consistently suggests that right-wing ideological adherents of all types are significantly more likely to deny climate change than their left-wing counterparts (e.g. Hoffarth & Hodson, 2016), the reason for this relationship is not well understood. One possibility, derived from System Justification Theory (SJT), is that right-wing adherents deny

climate change to resolve threats to the system that are presented by climate change mitigation policies (see Figure 4). Indeed, past research points to the possibility that climate change denial is a system-justifying behaviour due to demonstrated relationships between system justification behaviours and tendencies and climate change denial or denial of environmental problems (Feygina et al., 2010; Hennes, Nam, Stern, & Jost, 2012), and group threat and climate change denial (Hoffarth & Hodson, 2016). This novel hypothesis that right-wing climate change denial occurs because climate change mitigation poses a threat to the socioeconomic system will be referred to throughout this thesis as the Mitigation Threat Hypothesis. This section will provide an outline of SJT as well as the rationale for the Mitigation Threat Hypothesis. We will also address a lack of empirical evidence for the role of threats to the system in the right-wing tendency to system-justify. This chapter will conclude by outlining two studies that will attempt to deal with these limitations – one that examines the mediating effect of perceived system threat on the relationship between right-wing ideologies and system-justifying tendencies, and another that examines the specific mediating effect of climate change mitigation threat on the relationship between right-wing ideologies and climate change denial.

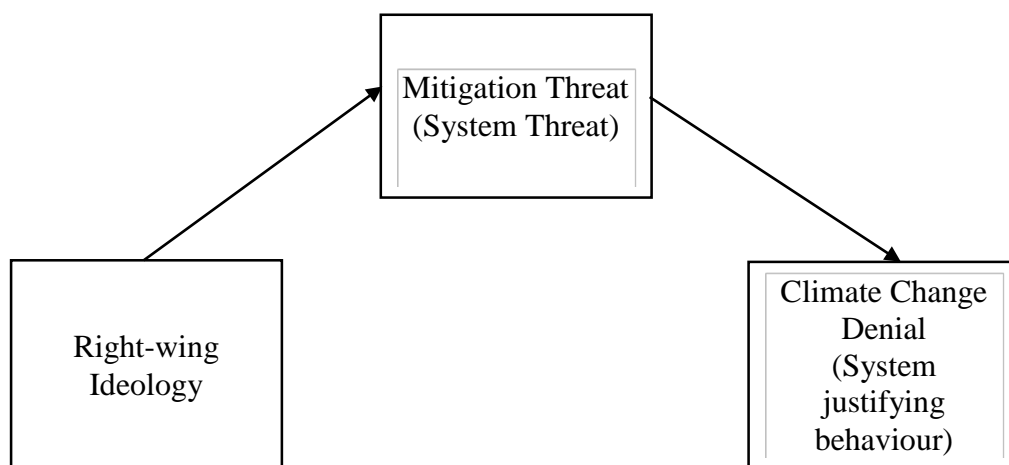


Figure 4 Hypothesised mitigation threat mediation of right-wing ideology and climate change denial

System Justification Theory

SJT suggests that people are motivated to varying degrees to actively defend the existing social system from threats, even when doing so can harm individual and group interests (Jost, Banaji, & Nosek, 2004; van der Toorn & Jost, 2014). In this context, “system” can refer to social, economic, or political arrangements in which individuals and/or groups exist (van der Toorn & Jost, 2014). The term “system justification” refers to behaviours that work to actively defend the system, or tendencies to perceive the system as legitimate and stable (Jost & Hunyady, 2005; Jost et al., 2008). According to SJT, system justifying beliefs and behaviours are motivated by situational and dispositional factors (van der Toorn & Jost, 2014) such as situational threats to the system (Ullrich & Cohrs, 2007; Wakslak, Jost, & Bauer, 2011), and heightened dispositional needs to reduce threat (Hennes et al., 2012). As a result, the theory predicts that perceived threats to the system increase the likelihood that people will engage in system-justifying behaviours as a way to reduce these threats (Kay & Friesen, 2011). Importantly, it is expected that this will occur irrespective of whether or not these behaviours contradict individual or group interests (Jost & Hunyady, 2005). When applied to climate change, System Justification Theory suggests denial occurs in response to the perception that climate change mitigation policies (such as carbon taxes and moving to a clean energy economy) pose a threat to the system (Feygina et al., 2010). Denying the problem removes the need for the threatening solution, and therefore actively supports the existing socioeconomic status quo.

Studies examining the system justification motivation have found that political conservatives are more prone to system-justifying tendencies (Jost et al., 2008) and behaviours (e.g. Feygina et al., 2010). With respect to the Dual-Process Model, SDO (Martin et al., 2014; Mosso, Briante, Aiello, & Russo, 2013) and RWA (albeit a weak relationship;

Osborne & Sibley, 2014) are also positively related to system-justifying tendencies. Based on SJT, this is suggested to be due to a heightened system threat perception on the part of right-wing adherents (Onraet, Van Hiel, Dhont, & Pattyn, 2013) and therefore a heightened need to reduce perceived threat (Hennes et al., 2012). However, evidence for this hypothesis is lacking, and no study has examined the explanatory role of system threat on the relationship between right-wing ideology and system-justifying tendencies.

The Effect of Threat on System-Justifying Outcomes

SJT defines system-justifying behaviours as behaviours that work to bolster and support the system when it is under threat (Jost et al., 2004). The theory predicts that “both chronic and temporary elevations” in needs to reduce threat will be associated with stronger needs to justify the system (Hennes et al., 2012, p. 672). Experimental research evidence suggests that threat manipulations, such as reminding participants of recent terrorist attacks or questioning the stability of the national political system, can trigger increases in how fair and legitimate an individual perceives the prevailing system (Ullrich & Cohrs, 2007; Wakslak et al., 2011), an outcome variable which is measured by the General System Justification scale (Kay & Jost, 2003). General system justification (defined as the tendency to perceive the prevailing social system as fair, legitimate, and justifiable), as well as economic system justification (defined as the tendency to legitimise economic inequality), are also positively correlated with threat measures such as death anxiety (Hennes et al., 2012). Threat manipulations also lead to behaviours that maintain the social status quo, such as victim derogation and victim enhancement processes (Kay, Jost, & Young, 2005), and complementary stereotyping (Jost, Kivetz, Rubini, Guermandi, & Mosso, 2005). As such, climate change denial may be a system-justifying behaviour insofar as the existence of climate change is associated with system-threatening mitigation solutions. In this

conceptualisation, downplaying climate change acts as a system justifying behaviour as it also downplays the need to change the system.

The Relationship between Threat and Right-Wing Ideology

For the Mitigation Threat Hypothesis to be plausible there is a need to establish that right-wing adherents are prone to heightened system threat perception as well as the need to reduce that threat. This positive relationship between threat perception and right-wing ideology is well-established and supported by a large amount of correlational and experimental evidence. Numerous studies point to a positive relationship between right-wing ideologies and the tendency to have heightened existential threat such as mortality salience, fear of death, and Belief in a Dangerous World (see Jost et al., 2003 for a meta-analysis). It appears that right-wingers have a heightened bias to negative and threatening stimuli (Hibbing, Smith, & Alford, 2014) and are more sensitive to threat than their left-wing counterparts (Lilienfeld & Latzman, 2014).

A more nuanced approach to the link between threat and right-wing ideology separates threat types into two broad categories: internal and external. Internal threats are threats that exist in the private sphere of the individual and are only experienced by that individual, such as death anxiety (Jost et al., 2003). On the other hand, external threats are defined as “ideological threats that stem from society, which pose a danger not only to oneself but also to society as a whole” (Onraet et al., 2013, p. 233). Although both broad threat types positively relate to right-wing ideology, external threats are shown to be more important in understanding the antecedents of right-wing ideologies as well as its effects on the right-wing tendency to system-justify (Onraet et al., 2013). External threats can have situational and dispositional (that is, the predisposition to experience higher levels of external threat) components (Onraet et al., 2013), and this thesis will focus on the latter. An example of a dispositional external threat variable is Belief in a Dangerous World (Duckitt, Wagner,

du Plessis, & Birum, 2002) which is demonstrated to have stronger relationships with RWA and SDO than internal threat variables (Onraet et al., 2013). With respect to the context of this thesis and the adoption of an SJT approach to understanding climate change denial in right-wingers, external threat variables such as Belief in a Dangerous World will be referred to as system threat variables.

In support of the dispositional system threat – ideology relationship, Jost et al. (2007) found that a single system threat item, measuring “way of life” concerns about terrorism, was positively related to conservative political orientation. Additionally, another system threat variable, political uncertainty (a threat variable relating to the level of personal uncertainty about the future of the socio-political system), was shown to positively correlate with RWA but not SDO (Shaffer & Duckitt, 2013). This evidence suggests that right-wing adherents are prone to heightened system threat perception, and given their tendency to have heightened levels of system justification, they may be prone to engage in system justification as a result of system threat in accordance with SJT (Kay & Friesen, 2011). However, no known study has examined the mediating effect of dispositional system threat on the relationship between right-wing ideology and system justification, therefore it is not known whether system threats are the route to system-justifying behaviours and tendencies among right-wing adherents.

Limitations and Future Research Directions

The previous sections have covered evidence suggesting that right-wing adherents are more prone to heightened system threat perception and are more likely to engage in system-justifying behaviours, however it is not known whether system threat explains the relationship between right-wing ideology and system justification in the general sense. It is important to first establish the theoretical underpinnings of the Mitigation Threat Hypothesis by testing mediation models that test whether system threat accounts for the right-wing tendency to system justify. The study presented in Chapter Six tests two such mediation

models: one with a unidimensional conceptualisation of ideology, and one utilizing the DPM to examine possible differential ideological effects.

Past research points to the possibility that climate change denial is a system-justifying behaviour due to demonstrated relationships between system justification behaviours and tendencies and climate change denial (Feygina et al., 2010; Hennes et al., 2012), and threat and climate change denial (Hoffarth & Hodson, 2016). However, no study has examined whether right-wing adherents perceive mitigation to be a threat to the socioeconomic status quo, and accordingly whether this mediates the relationship between right-wing ideology and climate change denial. The study described in Chapter Seven examines the mediating effect of climate change mitigation threat on the relationship between right-wing ideology and climate change denial by employing a measure of climate change mitigation threat. This study also compares a unidimensional ideological model with a multidimensional DPM approach.

Chapter Six: Study Three – The Role of System Threat in the Right-Wing Tendency to System-Justify

Abstract

Although right-wing adherents are more prone to heightened system threat perception and are more likely to engage in system-justifying behaviours, it is not known whether system threat explains the relationship between right-wing ideology and the tendency to system-justify.

Prior to testing the Mitigation Threat Hypothesis it is important to first establish the theoretical underpinnings of the ideology–system justification relationship. As such, the aim of this study was to examine the explanatory role of a system threat variable (Belief in a Dangerous World) on the relationship between ideology variables (ideological orientation, Right-wing Authoritarianism, and Social Dominance Orientation) and system justification tendencies. Participants ($N = 205$) were recruited via Facebook. Although, RWA, SDO and right-wing ideological orientation were positively associated with all types of system justification tendencies as well as Belief in a Dangerous World, mediation effects were not found. As a result, this study does not support the System Justification Theory argument that heightened chronic threat perception leads to system-justifying tendencies in right-wing adherents. Implications of this, particularly for the Mitigation Threat Hypothesis, are discussed.

Introduction

The previous chapter outlined a key component of SJT, that right-wing adherents are more prone to heightened system threat perception, and are more likely to engage in system-justifying behaviours. However, no study has examined the explanatory effect of individual differences in subjectively-perceived levels of system threat on the relationship between right-wing ideology and system justification. Furthermore, no study has examined this effect using a multidimensional conceptualisation of ideology such as the Dual Process Model of ideology (Duckitt & Sibley, 2009). This chapter reports on a study that examined the explanatory role of a system threat variable (Belief in a Dangerous World) on the relationship between ideology variables and system justification tendencies. This is an important step in examining the feasibility of the system justification approach in understanding the relationship between ideology and climate change denial. As detailed in the previous chapter, right-wing adherents may deny climate change insofar as they perceive climate change mitigation to be a threat to the system (Mitigation Threat Hypothesis). Understanding the role of individual differences in system threat at the general level, and its effect on ideology and system justification, helps us examine the potential for a specific type of system threat in mitigation to be a relevant factor in the right-wing tendency to deny climate change. Belief in a Dangerous World was chosen as it is conceptualised as a social world, or system threat perception variable (Duckitt & Sibley, 2009; Onraet et al., 2013), distinct from internal threats such as death anxiety.

The Present Research

This study aimed to examine the mediating effect of a system threat variable (Belief in a Dangerous World) on the relationship between right-wing ideology and two types of system justification tendency (economic and general). Second, by adopting the Dual Process Model conceptualisation of ideology, the study is able to examine whether there are differential

ideological effects on system justification outcomes, to gather a more nuanced understanding of the different ideological underpinnings of the tendency to justify and maintain the status quo.

Consistent with past research demonstrating a positive relationship between right-wing ideology and system justification tendencies (Hennes et al., 2012; Jost et al., 2008), right-wing ideological orientation as well as RWA and SDO was predicted to relate to both general and economic system justification (hypothesis one). Furthermore, given past research demonstrating similar relationships between threat variables and system justification types (Hennes et al., 2012), it was predicted that Belief in a Dangerous World would be positively related to both types of system justification (hypothesis two). Finally, based on SJT, which suggests that system threat leads individuals, and right-wing adherents in particular, to justify the system, it was predicted that Belief in a Dangerous World would: (a) mediate the positive relationship between ideological orientation and system justification in the unidimensional model (hypothesis three); and (b) mediate the relationship between the ideological dimensions RWA and SDO and system justification in the multidimensional model (hypothesis four).

Additionally, given that RWA and SDO could differentially predict system justification outcomes, as well as be differentially mediated by Belief in a Dangerous World, an aim of this study was to compare the multidimensional model of ideology with the unidimensional model to determine whether it would: (i) Explain more variance system justification; and (ii) whether the two dimensions of ideology differentially associated with Belief in a Dangerous World and system justification types.

Method

Participants

Two hundred and five participants (133 female, $M_{age} = 33.17$, $SD = 13.51$, range = 18-72) were recruited via social media platform Facebook. Eighty-one per cent of the sample had completed or were completing a university degree. Our sample leaned left-wing ideologically, with 60% identifying as left-leaning, compared to 18% identifying as conservative-leaning, and 21.5% scored at the midpoint of the single-item self-report scale. The sample was largely Australian in nationality (93%).

Materials³

Participants completed an online survey responding to questions relating to demographic information (age, gender, level of income, level of education), questions relating to political party identification and voting behaviour, as well as responding to the scales detailed below.

Economic System Justification (ESJ; $\alpha = .84$) – This 17-item scale measures “the general ideological tendency to legitimise economic inequality” (Jost & Thompson, 2000, p. 225). This scale is widely used in system justification research, with higher scores indicating a heightened tendency to justify the economic status quo.

³ The Need for Closure (NFC) scale was originally included in the questionnaire as a measure of epistemic uncertainty. This is because System Justification Theory predicts that both heightened threat and uncertainty drive needs to justify the status quo. However, this measure was excluded from the final analysis after a confirmatory factor analysis demonstrated that the five sub-factors of the NFC scale did not all positively correlate with one another as suggested in the original scale development study. In fact, one sub-factor was significantly negatively related to other sub-factors, and others were not significantly related at all. Furthermore, given that the final study of this thesis was examining the mediating role of climate change mitigation threat, the decision was made to exclude the NFC uncertainty measure and focus exclusively on the role of threat in the relationship between ideology and system justification. Given the theoretical considerations of the role of epistemic uncertainty in system justification, it may be worth examining uncertainty in future studies, however with a more reliable measure.

General System Justification (GSJ; $\alpha = .81$) – This eight-item scale measures “perceptions of fairness, legitimacy, and justifiability of the prevailing social system” (Kay & Jost, 2003, p. 828). Higher scores indicate a stronger perception that the current social system is fair and justifiable.

Right-Wing Authoritarianism (RWA; $\alpha = .92$) – The 22-item RWA scale represents socio-cultural ideology dimension and measures the tendency toward authoritarian and traditionalist attitudes, with higher scores indicating a greater tendency toward preference for authority, submission to authority and traditionalism. It is a unidimensional construct that contains three content clusters: Authoritarian aggression, authoritarian submission, and traditionalism (Altemeyer, 1998).

Social Dominance Orientation (SDO; $\alpha = .93$) – The 16-item SDO scale represents the economic ideology dimension. Higher scores indicate a preference for hierarchy and inequality in intergroup relations (Pratto et al., 1994).

Belief in a Dangerous World (BDW; $\alpha = .83$) – The ten-item Belief in a Dangerous World scale measures the extent to which an individual believes that “the social world as a dangerous and threatening place in which good, decent people’s values and way of life are threatened by bad people”, with higher scores indicating stronger beliefs in this direction (Duckitt et al., 2002, p. 78). This variable has been used in past research as a dispositional system threat variable (Onraet et al., 2013).

Ideological orientation: single-item 11-point self-placement measure assessing an individual’s ideological orientation on a scale ranging from 0 (left) to 10 (right). Higher scores on this scale indicate a more conservative or right-wing orientation.

Analytic Strategy

All analyses were conducted using SPSS 23 and AMOS 23 statistical software. All descriptive statistics and zero-order correlational analyses were conducted in SPSS, while path analyses were tested in AMOS. Multiple imputation was conducted to replace missing values in the dataset. Seventy-six participants had missing data on at least one scale item, and less than 1% of the overall data was missing. Hypotheses 1 to 4 were tested via two mediation models using maximum likelihood estimation. The two models were identical except that the first model utilised the single-item self-placement measure of political ideology (unidimensional model) and the second model measured ideology by the constructs RWA and SDO (multidimensional model). Bootstrapping was used to test the significance of the indirect paths.

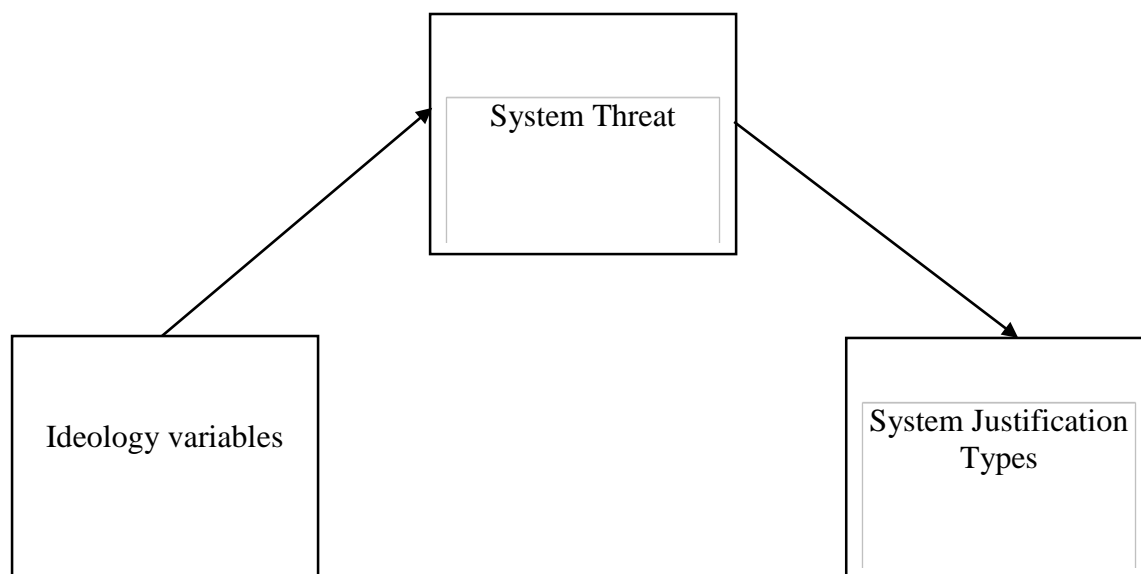


Figure 5 Hypothesised system threat mediation of ideology variables (ideological orientation in the unidimensional model, and RWA and SDO in the multidimensional model) and system justification types (general and economic).

To examine the relative effects of a single versus multidimensional approach to ideology on system justification types, we compared the unidimensional and multidimensional models for (i) variance explained and (ii) differential effects of ideology.

For the multidimensional model, RWA and SDO were tested simultaneously as independent variables, with Belief in a Dangerous World as the sole mediator. General and Economic System Justification were all tested simultaneously as outcome variables, and were all allowed to intercorrelate. The multidimensional ideological model also allowed us to examine the differential effects of our ideology measures (RWA and SDO) on our outcome variables.

Results

Bivariate Correlations

In support of past research, ideological orientation, RWA and SDO were all positively associated with both General and Economic System Justification outcomes (Hypothesis 1), as well as the Belief in Dangerous World mediator (Hypothesis 2). Belief in a Dangerous World was not significantly associated with General System Justification, although it was positively associated with Economic System Justification (See Table 8).

Table 8. Bivariate correlations and descriptive statistics for all variables in the unidimensional and multidimensional models

	1	2	3	4	5	Range	M	SD
1. Ideological Orientation						0-10	3.74	2.06
2. Right-Wing Authoritarianism	.60*					1-9	2.32	1.12
3. Social Dominance Orientation	.46*	.55*				1-7	2.16	0.96
4. Belief in a Dangerous World	.31*	.53*	.28*			1-7	3.15	1.03
5. General System Justification	.44*	.29*	.40*	-.11		1-9	4.69	1.33
6. Economic System Justification	.57*	.53*	.59*	.27*	.51*	1-9	3.99	1.14

* $p < .01$

System Threat Mediation

Total, direct, and indirect effects for ideology variables on all outcome variables for the unidimensional and multidimensional models are shown in Table 9 (see Appendix C.1 and C.2 for graphical representations of unidimensional and multidimensional path models respectively). Hypothesis three was not supported; the positive relationship between the ideological orientation item and the two system justification outcomes was not mediated by Belief in a Dangerous World in the unidimensional model. Hypothesis four was also not supported; there was no indirect effect on economic system justification for either of the two predictors, and no indirect effect on general system justification for SDO. In all cases, the size of the total and direct effects were close to identical. The effect of RWA on General System Justification increased in the mediation model, however the interpretation of this is problematic given that Belief in a Dangerous World and General System Justification are uncorrelated at the zero-order level.

Table 9 Standardised effects decomposition for unidimensional model and multidimensional model, predicting outcome measures

	General SJ	95% CI	Economic SJ	95% CI	BDW	95% CI
Unidimensional Model	$R^2=.26$		$R^2=.33$		$R^2=.10$	
Ideological Orientation						
Total effect	.44* (.06)	[.32, .56]	.57* (.05)	[.46, .66]	.31* (.07)	[.16, .43],
Direct effect	.53* (.06)	[.41, .63]	.53* (.06)	[.41, .64]		
Indirect effect	-.09* (.03)	[-.15, -.04]	.03* (.02)	[.00, .08]		
Belief in a Dangerous World (mediator)						
Total effect	-.27* (.07)	[-.39, -.14]	.11 (.06)	[-.01, .22]		
Multidimensional Model	$R^2=.26$		$R^2=.41$		$R^2=.28$	
Right-Wing Authoritarianism						
Total effect	.09 (.07)	[-.04, .24]	.28* (.06)	[.17, .40]	.54* (.07)	[.40, .66]
Direct effect	.29* (.07)	[.14, .44]	.29* (.07)	[.15, .43]		
Indirect effect	-.19* (.05)	[-.29, -.11]	-.00 (.04)	[-.07, .07]		
Social Dominance Orientation						
Total effect	.35* (.07)	[.19, .48]	.44* (.07)	[.29, .56]	-.01 (.08)	[-.17, .13]
Direct effect	.35* (.07)	[.19, .47]	.44* (.07)	[.29, .56]		
Indirect effect	.01 (.03)	[-.05, .07]	.00 (.01)	[-.01, .01]		
Belief in a Dangerous World (mediator)						
Total effect	-.36* (.07)	[-.49, -.21]	-.00 (.07)	[-.13, .13]		

BDW: Belief in a Dangerous World, SJ: System Justification * $p < .05$ Standard errors in parentheses.

Comparison of Ideological Models

Variance explained in general system justification was similar across both models, however the multidimensional model explained more variance in economic system justification, as shown in Table 10. The multidimensional model also explained more variance in the mediator (Belief in a Dangerous World) than the unidimensional model, 28% to 10% respectively.

Table 10 Percent variance explained (R^2) in outcome variables (and mediator) by predictor variables for the unidimensional model and the multidimensional model.

Outcome variable	Unidimensional Model	Multidimensional Model
General System Justification	26%	26%
Economic System Justification	33%	41%
Belief in a Dangerous World (mediator)	10%	28%

The multidimensional model allows us to compare differential ideological effects on system justification variables (see Table 9 for effects decomposition). SDO had significant direct effects on both system justification outcomes, however RWA had significant direct effects on economic but not general system justification.

Discussion

The overall aim of the study was to examine the theorised role of system threat in the association between right-wing ideology and system justification tendencies. Additionally, the study compared the differential effects of RWA and SDO on system justification outcomes in the multidimensional mediation model.

As predicted, and broadly consistent with past research (Hennes et al., 2012; Jost et al., 2008) all zero order correlations between RWA, SDO, ideological orientation, and

general and economic system were positive and significant. However, while the system threat variable (Belief in a Dangerous World) was positively related to all ideology variables and economic system justification, its relationship with general system justification was not significant. This was unexpected given that system justification theory predicts that higher dispositional threat perception should lead to a tendency to justify the system as a way to reduce threat, and past research has demonstrated a positive link between general system justification and threat (Hennes et al., 2012). The hypotheses (three and four) that Belief in a Dangerous World would mediate the relationship between the ideological variables and the two system justification types in the respective models were not supported. Belief in a Dangerous World did not mediate the relationships between ideological orientation and both types of system justification, and the indirect effect of ideological orientation and General System Justification via Belief in a Dangerous world was negative; however, this effect was small. Similarly, Belief in a Dangerous World did not mediate the relationship between SDO and system justification types, or RWA and economic system justification. Belief in a Dangerous World negatively mediated the relationship between RWA and general system justification, however again the effect was small.

These findings do not support the SJT prediction that right-wing adherents are more likely to have higher system justification tendency due to heightened levels of system threat perception. Although our findings demonstrate that right-wing adherents are higher in system justification tendency, and are more likely to perceive the world as a dangerous place, this threat perception did not explain the right-wing tendency to system-justify. According to these findings, dispositional threat perception may not explain the right-wing tendency to justify and support the system, contrary to SJT (Hennes et al., 2012). While individual differences in levels of system threat perception appear relevant for those high in RWA in

particular, the tendency of right-wing adherents to system-justify may fall to other as yet unexplored factors.

A key difference compared to other studies examining the effect of threat on system-justifying tendencies was the use of the system threat variable *Belief in a Dangerous World*, which had not been used as a mediating variable in the ideology – system justification relationship in previous studies. This variable measures the perception of the social world or system as unstable, out of control, and existentially threatening. Therefore, while it is still surprising that this threat measure did not significantly relate to general system justification at the zero order level, given that SJT predicts existential threat perception leads to system-justifying tendencies and behaviours, it is plausible that those who perceive society as threatening to the individual may wish for system change to address these dangers. It is possible that those high in RWA with high system threat, who favour a harsher approach to threatening and socially deviant individuals and groups (Gerber & Jackson, 2013), may believe that key system-maintenance actors such as the police and the justice system broadly are allowing the system to unravel due to a lenient or liberal approach to justice. Related to this argument, *Belief in a Dangerous World* might focus more on the existential threat posed to the individual as a result of an unstable system than being representative of a system threat perception itself. Although SJT predicts that such existential threats would activate system-justifying behaviour, it may be that threats to the system, or even a combination of system and existential threats, result in a higher system justification tendency in right-wing adherents.

On the other hand, the role of threat in the right-wing tendency to system-justify may be a process that occurs situationally and with respect to the threatening context, as opposed to chronic threat perception being the right-wing path to system justification. That is to say, specific and event-type threats to the system may activate a system-justifying behaviour or

increase a tendency to system justify. This was the first study to examine the role of dispositional threat perception and system-justifying tendencies with respect to right-wing ideology, and it may be that system justification only occurs in a threat context rather than manifesting as a stable tendency in response to a relatively stable threat perception tendency. This suggests that while threat did not explain the right-wing tendency to system-justify, it is possible that a specific type of threat may engage a specific type of system justifying behaviour. Contrary to expectations, both models performed similarly with respect to amount of variance explained in the system justification variables. However, model two predicted a larger amount of variance in the Belief in a Dangerous World mediator (28%) when compared to model one (10%). While this is expected given that variance explained would increase with the addition of an extra ideological variable, the use of RWA and SDO as ideological predictors in the single model allowed us to examine differential ideological effects that would not have been possible using a single-item orientation measure. Although both ideological variables were positively related to both system justification types, only RWA was positively related to the belief in a dangerous world mediator when RWA and SDO were allowed to correlate. Given the overall interest of this thesis in the role of threat in the relationship between right-wing ideology and climate change denial, understanding the differential relationships between ideology types and threat lend support to the continued use of the multidimensional ideological conceptualisation.

Limitations

Although this study adds to our understanding of the right-wing tendency to system-justify in the novel socio-political context of Australia, it is also limited in its generalisability by its almost exclusive focus on Australian participants. In addition to this, as this is the first study to examine the ideology–threat–system justification relationships in an almost exclusively Australian sample, it is possible that contextual differences related to Australia’s

socio-political landscape mean that hypothesised relationships (largely based on work conducted with U.S. samples) between chronic threat perceptions and system-justification tendencies are not applicable. Nonetheless, the study adds to our understanding of system-justification processes and their relationship to ideology in a context other than the U.S.

An additional issue possibly arising from the type of recruitment used was the left-wing skew of the sample. The means for both RWA and SDO were well below the mid-point for these scales and far more participants identified as left-wing than right wing.

Unfortunately, this problem is not particularly uncommon, and even online samples using Amazon MTurk are known to lean left-wing ideologically (Levay, Freese, & Druckman, 2016).

Conclusions

This study examined the theorised role of system threat in the right-wing tendency to system-justify. The findings suggest that, at least at the chronic and individual difference level, one measure of dispositional system threat in Belief in a Dangerous World may not explain why right-wing adherents are more likely to have higher levels of system justification tendency than their left-wing counterparts. While this contradicts an SJT account of the role of threat in the ideology–system justification relationship, it is still possible that the process of justifying the system is a situational process that only occurs when individuals are confronted with a specific and direct threat to the system. As such, it is possible that Belief in a Dangerous World is a poor indicator of system threat, as it focuses on personal existential threat as a result of a system that is already perceived to be unstable, as opposed to a direct threat to the system itself. Furthermore, this study only examined the role of the chronic tendency to perceive system threat, which means that it is difficult to conclude that threat, contextual or otherwise, is simply not a factor in the right-wing tendency to system justify. Therefore,

although Belief in a Dangerous World did not mediate the relationship between ideology and system justification tendencies, it is still possible that the specific threat of climate change mitigation will explain the relationship between ideology and climate change denial (a specific system-justifying behaviour). As such, the next chapter reports on a study that evaluates the system justification theory explanation for climate change denial by examining how climate change mitigation threat mediates the ideology–climate change denial relationship.

Chapter Seven: Study Four – Perceived Mitigation Threat Mediates Effects of Right-Wing Ideology on Climate Change Beliefs.

Abstract

Climate change is a politically polarized issue, with conservatives more likely to deny its existence and its origins in human behaviour than liberals. While the link between ideology and climate change denial is well-established, less is known about what drives this relationship. This study evaluates a system justification theory explanation for this phenomenon by examining how climate change mitigation threat mediates the ideology–climate change denial relationship. It extends understanding of this relationship by examining the differential effects of two types of right-wing ideology: Right-Wing Authoritarianism (RWA) and Social Dominance Orientation (SDO). Participants ($N = 334$) were recruited via Amazon MTurk. Both SDO and the conventionalism facet of RWA were positively associated with all types of climate change denial. These relationships were both partially mediated by climate change mitigation threat. RWA aggression and submission facets were not significant predictors of the climate change denial outcomes in the path model. These findings provisionally support the argument that certain right-wing adherents will engage in climate change denial at least in part due to a perception that mitigation strategies to combat climate change will threaten the socioeconomic status quo.

Note: This chapter was submitted as a manuscript to the Journal of Environmental Psychology, and is currently under review. A confirmatory factor analysis was conducted as a part of this study that was not included in the submitted manuscript but is included in the Results section of this chapter.

Introduction

Scientific issues are increasingly polarised, such that political ideology is often a predictor of an individual's position on issues where there is substantial scientific consensus (Lewandowsky, Gignac, & Oberauer, 2013). Climate change is a particularly polarised issue. Denial of climate change and climate science is more common among right-wing politicians (Fielding et al., 2012; Tranter & Booth, 2015), and right-wing adherents in general (Campbell & Kay, 2014; Guy, Kashima, Walker, & O'Neill, 2014; Heath & Gifford, 2006; Leviston et al., 2015; McCright & Dunlap, 2011b; McCright et al., 2016; Whitmarsh, 2011). A recent meta-analysis demonstrated that indicators of political orientation including party affiliation and types of political ideology are more predictive of climate change denial than other demographic variables such as education level, income, gender and age (Hornsey et al., 2016). Although the relationships are well established, this study extends knowledge of why and how ideology relates to climate change beliefs by addressing two issues: the role of climate change mitigation threat and the conceptualisation of ideology.

This study evaluates the System Justification Theory (SJT) explanation for climate change denial by examining whether climate change mitigation threat mediates the ideology–climate change denial relationship. According to SJT, system justifying beliefs and behaviours are motivated by situational and dispositional factors (van der Toorn & Jost, 2014) such as situational threats to the system (Ullrich & Cohrs, 2007; Wakslak et al., 2011), and heightened dispositional needs to reduce threat (Hennes et al., 2012). As a result, the theory predicts that perceived threats to the system increase the likelihood that people will engage in system-justifying behaviours as a way to reduce these threats (Kay & Friesen, 2011). Importantly, it is expected that this will occur irrespective of whether or not these behaviours contradict individual or group interests (Jost & Hunyady, 2005). When applied to climate change, System Justification Theory suggests denial occurs in response to the

perception that climate change mitigation policies (such as carbon taxes and moving to a clean energy economy) pose a threat to the system (Feygina et al., 2010). Denying the problem removes the need for the threatening solution, and therefore actively supports the existing socioeconomic status quo.

Past research points to the possibility that climate change denial is a system-justifying behaviour due to demonstrated relationships between system justification behaviours and tendencies and climate change denial (Feygina et al., 2010; Hennes et al., 2012), and threat and climate change denial (Hoffarth & Hodson, 2016). However, no study has examined whether right-wing adherents perceive mitigation to be a threat to the socioeconomic status quo, and accordingly whether this mediates the relationship between right-wing ideology and climate change denial.

Ultimately, understanding this relationship may help to better frame climate change solutions to facilitate productive public debate. Furthermore, given the nature of political polarisation across several social, economic, and environmental issues, understanding the psychological underpinnings of the relationship between right-wing ideology and climate change denial may also provide insight into the effect of types of ideology on positions on other contentious political issues of an empirical nature.

Motivated Denial - Climate Change Mitigation Threat

Feygina, Jost, and Goldsmith (2010) argue that climate change denial may be partly motivated by a need to reduce threat to the socioeconomic system that climate change mitigation (referred to in this paper as ‘mitigation threat’) poses. This hypothesis is based on SJT, which suggests that some individuals, and right-wing adherents in particular (Jost et al., 2008), are motivated to defend the status quo of a system when they perceive the system to be under threat, even in cases where their self-interest is undermined (Jost et al., 2004).

Experimental evidence supporting SJT suggests that system threats can shift beliefs and behaviours to become more supportive of the system (Kay et al., 2005; Ullrich & Cohrs, 2007). For example, invoking the possibility of a terrorist attack on home soil was shown to increase the level of system justification (that is, the level of support for the existing social and political system in which one lives) in an experimental group when compared to a control (Ullrich & Cohrs, 2007). Criticism of one's country can also invoke system-justifying behaviours such as increased endorsement of system-justifying stereotypes (e.g. that powerful people are intelligent; Kay et al., 2005). Furthermore, right-wing adherents are more likely to perceive threats (Duckitt & Sibley, 2009; Hibbing et al., 2014; Jost et al., 2003), and system threat in particular (Onraet et al., 2013).

In the context of climate change denial, SJT predicts that right-wing adherents will deny climate change because they are motivated to reduce the threat to the socioeconomic system represented by climate change mitigation policies (e.g. carbon tax/cap and trade, reducing fossil fuel use). These policies necessarily require significant changes to the system that may be undesirable or threatening to individuals who are ideologically-aligned with the status quo. Supporting this contention, Feygina et al. (2010) found that the general tendency to system-justify, and the tendency to perceive the economic status quo as fair, partially mediated the relationship between political orientation and broad environmental concern. However, that study did not directly test the claim that threat itself mediates the relationship between right-wing ideology and the tendency to deny climate change, and given that their outcome variable was environmental denial and not climate change denial, conclusions with respect to system-justifying effects on the ideology–climate change denial relationship must be drawn with care. In one study that explored the role of a specific type of threat on the ideology–climate change denial relationship, Hoffarth and Hodson (2016) discovered that environmentalist threat mediated the relationship between ideological variables (i.e. RWA

and SDO) and climate denial, which lends support to the threat reduction argument. This study extends upon these findings by examining the effect of a broader system threat on the ideology–climate change denial relationship, such as climate change mitigation threat, as opposed to the perceived threat of a specific social group.

Differential Ideological Predictors of Climate Change Denial

A limitation of much of the past research on the ideology–climate change denial relationship is in how political ideology has been conceptualised and measured. Typically, single-item self-placement measures where individuals place themselves on a bipolar scale that has liberal and conservative endpoints are used as a proxy of an individual's ideology. This is problematic given extensive research indicating the existence of at least two distinct strands of political ideology (Feldman & Johnston, 2013; Jost et al., 2003). These ideological dimensions are sometimes labelled 'resistance to change' and 'acceptance of equality' (Jost et al., 2003) or 'social' and 'economic' ideology (Feldman & Johnston, 2013). These dimensions are commonly operationalised as the psychological constructs Right-Wing Authoritarianism (RWA; which represents the dimension of resistance to change/social ideology) and Social Dominance Orientation (SDO; which represents the dimension of acceptance of equality/economic ideology). High levels of RWA indicate high submission to authority, a commitment to norms and conventions of society, and a preference for authority to punish deviants and norm violators (Altemeyer, 1998; Funke, 2005), whereas high levels of SDO indicate a preference for intergroup hierarchy and group dominance (Ho et al., 2015; Pratto et al., 1994). The Dual Process Model suggests that while high RWA and high SDO will sometimes predict support for the same sets of government policies, the mechanisms underlying these outcomes will differ (Duckitt & Sibley, 2009). As such, adopting an approach that incorporates both ideological dimensions allows assessment of potential differential effects of these political ideologies on climate change denial.

Indeed, studies have found that RWA and SDO are significant ideological predictors of climate change denial (Häkkinen & Akrami, 2014; Hoffarth & Hodson, 2016; Milfont et al., 2013; Stanley et al., 2017), and despite being correlated, often predict denial independent of one another. Although SDO was the only significant predictor of climate change denial out of the two ideological variables in one study (Häkkinen & Akrami, 2014), both SDO and RWA have been shown to independently explain variance in climate change denial (Milfont et al., 2013). RWA and SDO were also independent predictors of denial through an environmentalist threat mediator (that is, perceived threat to society, tradition, and the economy posed by environmentalists; Hoffarth & Hodson, 2016). In sum, the findings regarding the contributions of RWA and SDO could suggest the possibility of different right-wing ideological pathways to climate change denial, highlighting the merit in the continued examination of the effects of the two ideological paths of the multidimensional model on climate change denial.

The Present Research

Given the relationship between right-wing ideologies and perception of system threat, climate change denial may in fact be a threat-reduction strategy appealing to right-wing adherents (Feygina et al., 2010). However, it is not known whether different types of right-wing adherents (RWA and SDO) will react to that type of mitigation threat differently. Utilising a multidimensional model of ideology allows examination of this. Finally, investigating the explanatory value of system-level threat in the context of a polarised issue such as climate change may have implications for other political issues.

The aim of this study is two-fold. First, to extend understanding of the relationship between political ideology and climate change denial by examining the mediating role of climate change mitigation threat. Second, to examine whether there are differential

associations between the two types (RWA, SDO) of ideology and climate change denial outcomes.

Consistent with past research demonstrating a positive relationship between right-wing ideology and climate change denial (Häkkinen & Akrami, 2014; Hoffarth & Hodson, 2016; McCright & Dunlap, 2011a; Milfont et al., 2013), we predicted that ideological types in both the unidimensional (Ideological orientation) and multidimensional models (RWA and SDO) would be positively associated with climate change denial (hypothesis one). Furthermore, consistent with SJT (Feygina et al., 2010; Kay & Friesen, 2011), it was predicted that climate change mitigation threat would be positively related to climate change denial (hypothesis two). Finally, consistent with Feygina et al.'s (2010) system justification argument that right-wing adherents are more likely to engage in motivated denial of climate change to maintain the threatened socioeconomic status quo, it was predicted that climate change mitigation threat would: (a) mediate the positive relationship between ideological orientation and climate change denial in the unidimensional model (hypothesis three); and (b) mediate the relationship between the ideological dimensions RWA and SDO and climate change denial in the multidimensional model (hypothesis four).

Additionally, given that RWA and SDO could differentially predict climate change denial outcomes, as well as be differentially mediated by climate change mitigation threat, we compared the multidimensional model of ideology with the unidimensional measurement model to determine whether it: (i) explained greater variance in climate change denial; and (ii) whether the two dimensions of ideology differentially associated with threat and climate change denial.

Materials and Methods

Participants

A sample of 334 U.S. participants (137 female; $M_{age} = 34.7$, $SD = 5.98$, range = 19-70) were recruited through Amazon Mechanical Turk. As appears to be typical with MTurk samples (Levay et al., 2016), our sample leaned liberal ideologically, with 59.9% identifying as liberal or liberal-leaning, 21.6% identifying as conservative or conservative-leaning, and 18.5% scored at the mid-point of the single-item self-report scale.

Materials

Right-Wing Authoritarianism (RWA): Funke's (2005) multifactorial 12-item RWA scale is a shorter version of the original RWA scale, which designates four items to each of the three facets, measured on a 7-point Likert scale: Authoritarian aggression (Aggression; $\alpha = .72$), authoritarian submission (Submission; $\alpha = .77$), and conventionalism (Conventionalism; $\alpha = .84$).

Social Dominance Orientation (SDO; $\alpha = .89$): This 8-item short form of the SDO7 scale developed by Ho et al. (2015) measures the tendency to prefer group-based hierarchy and inequality, on a 7-point Likert scale.

Ideological orientation: single-item 11-point self-placement measure assessing an individual's ideological orientation on a scale ranging from 0 (extremely liberal) to 10 (extremely conservative). This type of orientation measure is commonly used in climate change belief research (e.g. McCright & Dunlap, 2011a).

Climate Change Mitigation Threat (CCMT; $\alpha = .96$): The 12-item CCMT Scale (see Appendix D.4 for scale items) was developed for this study and measures the perceived threat of climate change mitigation efforts (e.g. carbon pricing, caps on emissions, moving away

from fossil fuel use) on the stability of the social and economic status quo, on a 7-point Likert scale. Higher scores on this scale indicate greater levels of perceived socioeconomic threat caused by climate change mitigation policies.

Climate Change Denial: The 16-item climate change denial scale (see Appendix D.4 for scale items) is a multifactorial scale based on a previous climate change denial scale created by Häkkinen and Akrami (2014). As discussed in Chapter Four, the original scale was modified for this study based on the findings of studies one and two of this thesis. The scale measures four types of climate change denial (denial of existence of climate change ($\alpha = .85$), denial of human cause ($\alpha = .93$), impact denial ($\alpha = .93$), and climate science denial ($\alpha = .91$)), on a 7-point Likert scale. Higher scores on each factor indicate higher levels of the specific type of climate change denial.

Analytic strategy

All analyses were conducted using SPSS and AMOS 23. All descriptive statistics and zero-order correlational analyses were conducted in SPSS, while path analyses were tested in AMOS. Multiple imputation was conducted to replace missing values in the dataset. Twenty-nine participants had missing data on at least one scale item, and less than 1% of the overall data was missing. Prior to hypothesis testing, confirmatory factor analyses were conducted on all scales used in the analyses. Hypotheses 1 to 4 were tested via two mediation models using maximum likelihood estimation. The two models were identical except that the first model utilised the single-item self-placement measure of political ideology (unidimensional model) and the second model measured ideology by the constructs RWA and SDO (multidimensional model; see Figure 1). Bootstrapping was used to test the significance of the indirect paths.

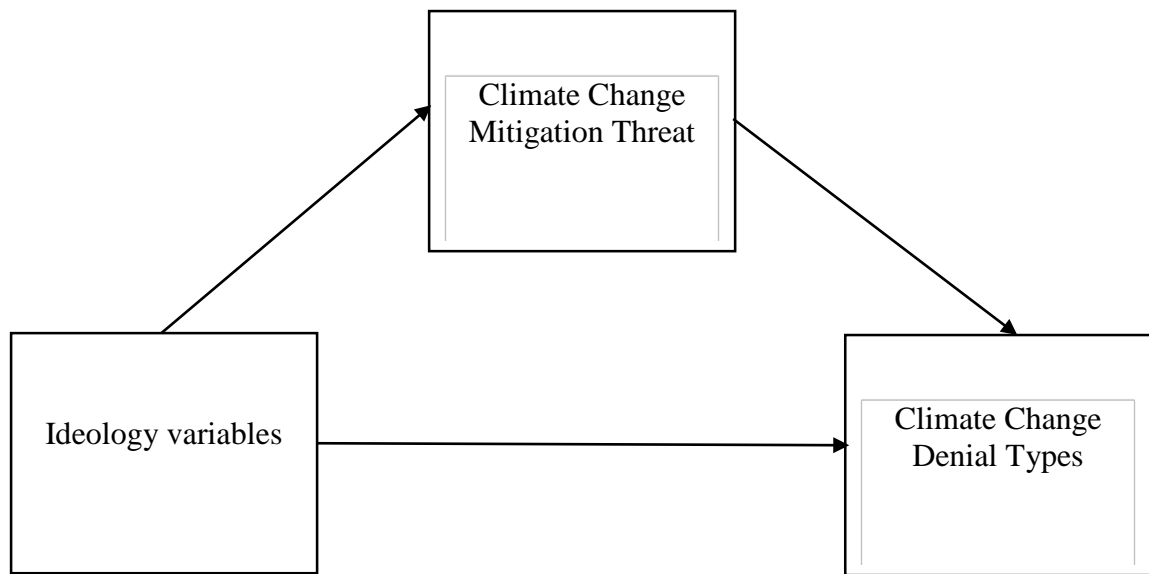


Figure 1. Hypothesised mitigation threat mediation of ideology variables (ideological orientation in the unidimensional model, and RWA and SDO in the multidimensional model) and climate change denial types (existence, human cause, impact, and climate science).

To examine the relative effects of a single versus multidimensional approach to ideology on types of climate change denial, we compared the unidimensional and multidimensional models for (i) variance explained and (ii) differential effects of ideology. For the multidimensional model, the three RWA factors (Submission, Aggression and Conventionalism) and SDO were tested simultaneously as independent variables, with Climate Change Mitigation Threat as the sole mediator. Existence denial, human cause denial, impact denial, and climate science denial were all tested simultaneously as outcome variables, and were all allowed to intercorrelate. The multidimensional ideological model also allowed us to examine the differential effects of our ideology measures (RWA and SDO) on our outcome variables.

Results

Confirmatory Factor Analysis of Variables Used in Path Analyses

Confirmatory factor analyses (CFA), using maximum likelihood estimation method and run with AMOS version 23 (2015), were conducted on the scales used in this study to establish construct validity. The fit of each model was assessed using the chi-square (χ^2) statistic, the Comparative Fix Index (CFI), the Tucker-Lewis Index (TLI), the Standardised Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA). According to recommendations by Hu and Bentler (1999) good model fit is suggested when the CFI and TLI are each greater than .90, the SRMR is less than .08, and the RMSEA is less than .06. Fit statistics for all variables are listed in Table 11.

Table 11 Fit Indices for Confirmatory Factor Analysis of Scales

Latent Variables	χ^2 (df)	CFI	TLI	SRMR	RMSEA
RWA (one factor)	1836.122 (270)*	.854	.822	.066	.059
RWA (three factors)	1122.231 (250)*	.919	.893	.058	.046
SDO (one factor)	43.302 (19)*	.984	.976	.027	.062
SDO (two factors)	37.734 (19)*	.988	.982	.026	.054
SDO (bifactor model)	16.288 (12)	.997	.993	.018	.033
CCMT	1169.451 (265)*	.952	.941	.030	.045
CCD (one factor)	3687.270 (520)*	.889	.872	.045	.060
CCD (four factors)	1639.100 (500)*	.960	.952	.034	.037

Note. RWA = Right-Wing Authoritarianism; SDO = Social Dominance Orientation; CCMT = Climate Change Mitigation Threat; CCD = Climate Change Denial; χ^2 = chi-square; df = degrees of freedom for χ^2 ; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardised Root Mean Square of the Residual; RMSEA = Root Mean Square Error of Approximation.

* $p < .05$

Right-Wing Authoritarianism. The 12-item Right-Wing Authoritarianism scale (Funke, 2005) is designed as a multifaceted scale that separates the RWA facets of Conventionalism, Submission, and Aggression. However, given possible issues of multicollinearity when these related factors are used in path analyses it was decided to first compare the model fit of a one factor model with a three factor model. Fit indices listed in Table 11 suggest that the one factor model is a poor fit to the data despite the SRMR and RMSEA being below acceptable cut-offs. The three-factor solution was a better fit to the data (despite the TLI being just below the .9 cut-off). Furthermore, correlations between the factors (see Table 12) suggested that they are distinct although highly related factors. Multicollinearity diagnostic tests yielded figures for VIF and tolerance well below the widely suggested cut-offs of less than 10 for VIF and less than .2 for tolerance (O'Brien, 2007), therefore the decision was made to adopt the three-factor RWA model.

Social Dominance Orientation. The 8-item Social Dominance Orientation Scale is also designed as a multifaceted scale, comprising a dominance and an antiegalitarian factor.

However, the authors suggest that its use as a multifaceted scale depends on the objective of the research. As such, CFAs were conducted for both single factor and two factor solutions. Although similar, the two factor solution demonstrated slightly better model fit with the RMSEA less than .06. However, this model also showed that the two factors were highly correlated ($r=.91$). In light of this high correlation, a bifactor model was evaluated with a general factor in addition to subfactors accounting for the residual covariance in item sets corresponding to dominance and antiegalitarianism. This structure had strong fit and given the stronger loading of items on the general factor in general justifies the focus on this model of SDO in secondary analyses (Reise, Moore, & Haviland, 2010).

Climate Change Mitigation Threat. The 10-item Climate Change Mitigation Threat scale is a unifactorial scale designed for this study. Fit indices listed in Table 11 indicate that this scale is a good fit to the data.

Climate Change Denial. The 16-item Climate Change Denial scale is a modified scale based on an existing scale used in a prior study (Häkkinen & Akrami, 2014). In this study the scale was used to measure a single climate change denial factor. However, the scale items refer to four distinct types of climate change denial. Therefore we conducted separate CFAs for a single factor and a four factor model, with the four factor model demonstrating good model fit and the one factor model fitting poorly.

Bivariate Correlations

Ideological orientation, RWA (all factors) and SDO were positively associated with greater levels of climate change denial (See Table 12). Consistent with hypothesis one, all ideological variables were positively related to climate change mitigation threat, which was itself positively related to all climate change denial variables (hypothesis two).

Table 12 Bivariate correlations and descriptive statistics for all variables.

	1	2	3	4	5	6	7	8	9	Range	M	SD
1. Ideological Orientation										0-10	4.77	2.55
2. Conventionalism	.64									1-7	3.02	1.53
3. Aggression	.51	.67								1-7	3.55	1.35
4. Submission	.58	.80	.73							1-7	3.09	1.21
5. Social Dominance Orientation	.50	.45	.49	.44						1-7	2.56	1.22
6. CC Mitigation Threat	.46	.44	.33	.41	.38					1-7	3.18	1.36
7. Existence Denial	.48	.49	.31	.39	.45	.58				1-7	2.43	1.29
8. Human Cause Denial	.45	.43	.29	.34	.41	.61	.79			1-7	2.81	1.50
9. Impact Denial	.48	.48	.30	.38	.44	.63	.81	.87		1-7	2.49	1.45
10. Climate Science Denial	.52	.52	.39	.43	.39	.62	.81	.79	.81	1-7	2.63	1.51

Note. All correlations were significant at $p < .001$

Climate Change Mitigation Threat Mediation

Total, direct, and indirect effects for ideology variables on all outcome variables for the unidimensional and multidimensional models are shown in Table 13 (for a graphical representation of these results see Appendix C.2). Hypothesis three was partially supported. The positive relationship between the ideological orientation item and all climate change denial outcomes was partially mediated by climate change mitigation threat in the unidimensional model. Hypothesis four was also partially supported. Climate Change Mitigation Threat partially mediated all paths from Conventionalism and SDO, and all climate change denial variables in both models. Significant indirect effects were found between both Conventionalism and SDO and the outcome variables, although the direct effects remained relatively large as a proportion of total effect. Although the total effects on the outcomes were similar for Conventionalism and SDO, Conventionalism ($\beta = .45$ $p < .05$, 95% CI [.29, .62]) had a larger estimated total effect on Climate Science Denial than SDO ($\beta = .20$, $p < .05$, 95% CI [.08, .32]).

Table 13 Standardised effects decomposition for Models One and Two, predicting outcome measures

	ED	95% CI	HCD	95% CI	ID	95% CI	CSD	95% CI	CCMT (mediator)	95% CI
Unidimensional Model	R²=.39		R²=.41		R²=.44		R²=.46		R²=.21	
Lib-Con										
Total effect	.48*(.05)	[.38, .56]	.45* (.05)	[.35, .53]	.48* (.05)	[.38, .56]	.52* (.04)	[.43, .59]	.45*(.05)	[.35, .54]
Direct effect	.27*(.05)	[.16, .37]	.21* (.05)	[.12, .31]	.24* (.05)	[.14, .34]	.29* (.05)	[.20, .38]		
Indirect effect	.21*(.03)	[.15, .28]	.23* (.04)	[.17, .31]	.24* (.04)	[.17, .31]	.22* (.03)	[.17, .29]		
CCMT (mediator)										
Total effect	.46*(.06)	[.35, .56]	.51* (.05)	[.40, .61]	.52* (.06)	[.40, .62]	.49* (.06)	[.38, .60]		
Multidimensional Model	R²=.45		R²=.44		R²=.48		R²=.47		R²=.24	
Conventionalism										
Total effect	.45*(.08)	[.30, .59]	.39*(.09)	[.21, .57]	.44*(.09)	[.27, .61]	.45*(.09)	[.29, .62]	.29*(.10)	[.09, .47]
Direct effect	.33*(.07)	[.20, .46]	.25*(.08)	[.11, .42]	.30*(.07)	[.17, .46]	.31*(.08)	[.17, .46]		
Indirect effect	.12*(.04)	[.03, .21]	.14*(.05)	[.05, .25]	.14*(.05)	[.05, .25]	.14*(.05)	[.05, .25]		
Aggression										
Total effect	.16*(.07)	[-.30, -.02]	-.10 (.07)	[-.23, .05]	-.14 (.07)	[-.28, .01]	.01 (.07)	[-.14, .15]	-.08 (.08)	[-.22, .07]
Direct effect	-.13 (.06)	[-.24, .00]	-.06 (.06)	[-.18, .07]	-.10 (.06)	[-.23, .02]	.05 (.06)	[-.07, .17]		
Indirect effect	-.03 (.03)	[-.10, .03]	-.04 (.04)	[-.12, .03]	-.04 (.04)	[-.11, .03]	-.04 (.04)	[-.11, .03]		
Submission										
Total effect	.00 (.09)	[-.17, .16]	-.04 (.09)	[-.22, .15]	-.02 (.09)	[-.19, .15]	-.03 (.09)	[-.20, .15]	.14 (.09)	[-.04, .32]
Direct effect	-.06 (.09)	[-.20, .09]	-.11 (.08)	[-.27, .05]	-.09 (.07)	[-.23, .05]	-.10 (.08)	[-.25, .05]		
Indirect effect	.06 (.04)	[-.01, .13]	.07 (.05)	[-.02, .16]	.07 (.05)	[-.02, .16]	.06 (.04)	[-.02, .16]		
SDO										
Total effect	.33*(.06)	[.22, .44]	.32*(.06)	[.20, .42]	.33*(.06)	[.21, .44]	.20*(.06)	[.08, .32]	.23*(.07)	[.10, .36]
Direct effect	.24*(.06)	[.13, .35]	.20*(.06)	[.09, .32]	.22*(.06)	[.11, .34]	.09 (.06)	[-.02, .21]		
Indirect effect	.09*(.03)	[.04, .16]	.11*(.04)	[.05, .19]	.11*(.03)	[.05, .18]	.11*(.03)	[.05, .19]		
CCMT (mediator)										
Total effect	.41*(.06)	[.30, .51]	.48*(.06)	[.36, .60]	.48*(.06)	[.36, .58]	.47*(.06)	[.35, .59]		

ED = Existence Denial; HCD = Human Cause Denial; ID = Impact Denial; CSD = Climate Science Denial; CCMT = Climate Change Mitigation Threat; Lib-Con = Ideological Orientation.

* $p < .05$ Standard errors in parentheses.

Comparison of Ideological Models

Variance explained in the four outcome variables was similar across both models, ranging from 39% to 46% in the unidimensional ideological model, and 43% to 47% in the multidimensional ideological model, as shown in Table 14. Similarly, there was only a slight difference between variance explained in the mediator (climate change mitigation threat) across both models.

Table 14 Percent variance explained in outcome variables (and mediator) by predictor variables for the unidimensional model and the multidimensional model.

Outcome variable	Unidimensional Model	Multidimensional Model
Existence Denial	39%	45%
Human Cause Denial	41%	44%
Impact Denial	44%	48%
Climate Science Denial	46%	47%
CC Mitigation Threat (mediator)	21%	24%

The multidimensional model allows us to compare differential ideological effects on climate change denial variables (see Table 13 for effects decomposition). Conventionalism and SDO had significant total effects on all climate change denial outcomes. Aggression and Submission had much smaller, and in almost all cases, nonsignificant effects on all climate change denial outcomes.

Discussion

The overall aim of this study was to extend understanding of the relationship between political ideology and types of climate change denial by examining the explanatory role of climate change mitigation threat on the ideology–climate change denial relationship. The use of a multidimensional ideological approach also enabled us to better characterise the nature of the ideology–climate change denial relationship.

As predicted, and consistent with past research (e.g. Hoffarth & Hodson, 2016), ideological orientation, SDO, and the three RWA factors significantly and positively related to all four types of climate change denial (hypothesis one). The predicted positive relationship between climate change mitigation threat and our types of climate change denial was also supported (hypothesis two), suggesting that those who perceive attempts to mitigate climate change as threatening to the socioeconomic system are also likely to engage in denial. Additionally, the hypotheses (three and four) that climate change mitigation threat would mediate the relationship between the ideological variables and the four types of climate change denial in the respective models were partially supported. Climate change mitigation threat partially mediated the relationship between the self-placement ideology measure and types of climate change denial in the unidimensional model (hypothesis three), and Conventionalism and SDO on four types of climate change denial in the multidimensional model (hypothesis four).

These findings lend partial support to SJT explanation of climate change denial, that right-wing adherents may be denying climate change, in part, due to the perception that mitigation policies such as carbon taxes and moving away from fossil fuels could destabilise the economy and the socioeconomic status quo (Feygina et al., 2010). However, given that ideological orientation in the unidimensional model, and both conventionalism and SDO in the multidimensional model still significantly contributed to the variance explained in climate change denial types via the direct paths, this suggests that mechanisms beyond mitigation threat contribute to this relationship. For instance, given that the direct path between ideological orientation and climate change denial types remained significant in the unidimensional ideological model, it is possible that part of the process of conservative identification leads individuals to adopt typical conservative issue positions, such as denial of climate change (McCright & Dunlap, 2011a). Nonetheless, given that climate change

mitigation threat was a measure of the level of perception that solutions such as carbon taxes would destabilise the socioeconomic status quo, there is merit in the argument that mitigation threat is at least one of several possible mechanisms that explain the right-wing tendency to deny climate change. This finding builds on past work on the system-justifying bases of climate change denial, which had previously demonstrated that the tendency to justify the status quo partially explained right-wing denial of climate change (Feygina et al., 2010), by allowing us to point to a possible mechanism. Specifically, for right-wing adherents, the perceived threat of climate change mitigation may trigger a threat-reduction or system-justifying response: climate change denial.

With respect to the relative performance of the unidimensional versus multidimensional ideological approaches, both models performed similarly in terms of the amount of variance explained in the dependent variables. The path model utilising the multidimensional approach (model two) explained between 1 to 5% more variance in the climate change denial outcomes than the model using the single item ideological measure (model one). Based on this finding it would be tempting to conclude that a single item ideology measure is adequate to use when investigating the ideology-climate change denial relationship. However, the multidimensional model demonstrated some important differences between the effects of our two ideological dimensions that would not be elucidated using a single-item self-placement measure. SDO and the conventionalism dimension of RWA (but not Aggression and Submission) remained significant independent predictors of all outcome variables, lending some support to past findings suggesting that right-wing denial of climate change may occur independently through both RWA and SDO (Hoffarth & Hodson, 2016). Additionally, as we could compare the three RWA factors using the multifactorial measure of RWA, we discovered that the total effects of the RWA dimensions Aggression and Submission were comparatively small and in almost every case statistically nonsignificant.

This suggests that the aggression and submission aspects of RWA may be less relevant when examining the effects of RWA on climate change denial, and it is the aspect of RWA concerned with adherence to tradition and social norms that is of most importance.

Although the amount of variance explained in our four climate change denial outcome variables was relatively similar, the multidimensional model demonstrated differential effects of Conventionalism and SDO on Climate Science Denial, such that that Conventionalism ($\beta = .45$, 95% CI [.29, .62]) was a stronger predictor of climate science denial (SD) than SDO ($\beta = .20$, $p < .05$, 95% CI [.08, .32]) This may suggest that conventionalists are more likely to hold more scepticism of climate evidence and therefore may have lower levels of trust in climate science and scientists than those high in SDO. There is no evidence to our knowledge that has adopted the Dual-Process Model of ideology to examine relationships between ideology and climate science denial specifically and independently of other types of climate change denial, therefore this finding is novel and furthers our understanding of the nuanced nature of the relationship between ideology and beliefs about climate science in particular.

The multidimensional model of ideology uncovers the complexity of the ideology-climate change denial relationship by way of illustrating the different ideological paths to denial, through climate change mitigation threat. Conventionalists' preference for social order and the maintenance of existing social practices and norms could lead them to perceive mitigation strategies as threatening to the social and economic world that they are most familiar with. On the other hand, those high in SDO who also engage in climate change denial may not take issue with general changes to the socioeconomic system as such, however they may find it difficult to accept those changes that threaten a system with existing economic and hierarchical inequalities. Mitigation solutions such as carbon taxes and restriction on the free-market could be perceived as threatening a preferred economic ideological standpoint, that hierarchy, group dominance and inequality are natural by-

products of society, and government intervention is not warranted even in the case of environmental issues (Campbell & Kay, 2014). Understanding the different ideological paths to climate change denial and the underlying ideological reasons for perceived mitigation threat could assist us in tailoring fact-based messaging regarding both climate risks and the consequences of mitigation (or doing nothing about climate change), to different segments of the community. Finally, such effects could be replicated in other polarised policy areas where system threat may be a factor. In particular, issues involving acceptance of scientific evidence may be specifically amenable to the multidimensional approach, given the finding in this study that the effect of Conventionalism on climate science denial was stronger than for SDO.

Limitations and Future Directions

Given threat salience was not manipulated in this study, the findings do not demonstrate that climate change mitigation threat causes right-wing adherents to deny climate change. Nonetheless, these findings represent a step forward in our understanding of the possible psychological underpinnings of the relationship between right-wing ideologies and climate change denial in contexts where the issue is politically polarised. Future research should examine the effects of climate change mitigation messaging and information on the propensity to be concerned about the impact of climate change. Furthermore, as this study focuses on a single science issue that is viewed by the political right as controversial or debatable, our study did not address the possibility of left-wing threat perception related to other science issues where the common left-wing position is at odds with the scientific consensus. That is to say, our findings do not resolve the broader discussion regarding the cause of science denial being a function of a right-wing tendency to be sceptical of science versus perceptions of aspects of particular science-based issues being influenced by ideologically-motivated reasoning, across the political spectrum. Finally, due to the use of

Amazon MTurk as a method of recruitment, our study only sampled US residents, which limits our ability to generalise across other Western nations where social and political conditions, and therefore the resulting correlates of climate change denial, may be different.

Conclusions

Our study examined a hypothesised but not previously tested explanation for climate change polarisation that right-wing adherents are more likely than their left-wing counterparts to engage in types of climate change denial due to the perceived system threat posed by climate change mitigation. These findings suggest that popular solutions for climate change, such as carbon taxes and reducing fossil fuel reliance, may provide concern for right-wing adherents who either view these solutions as system destabilising, or are ideologically opposed to stronger government influence in the economy. Understanding the underlying factors involved in right-wing denial of climate change should work to enable more nuanced and considered policy debate when discussing solutions for mitigating climate change as well as reducing the catastrophic effects of extreme weather events linked to the phenomenon. Additionally, policy framing may benefit from the understanding that some mitigation strategies may at least lack surface appeal to various groups and individuals in the community. Finally, this study has adopted an approach to ideology that may help to shed light on correlates and causes of other polarised policy issues where different types of liberals and conservatives have differences of opinion. Future research could examine issues where low science acceptance exists among left-wing adherents, such as nuclear energy generation (Kahan, Jenkins-Smith, & Braman, 2011), with a dual-process ideology and threat framework, to better understand the generality of these science denial motivations.

Chapter Eight: General Discussion and Concluding Remarks

Introduction

Within the program of research outlined in this thesis I applied a System Justification Theory approach to understand the right-wing tendency to deny climate change. I achieved this by examining the mediating effect of climate change mitigation threat on the right-wing ideology-climate change denial relationship, as well as adopting the Dual Process Model (DPM) of Ideology. To do this, I explored community understanding of climate change (Study One, Chapter Three) to assist in the construction of a comprehensive measure of climate change denial. Next, I conducted a pilot study (Study Two, Chapter Four) that tested an existing climate change scale which addressed conceptual and measurement issues highlighted by the findings from Study One. The next step was to test the System Justification Theory claim that higher perceived system threat leads individuals, and right-wing adherents in particular, to engage in system justification in a general context (Study Three, Chapter Six). I utilised the DPM to explore the differential effects of RWA and SDO on system justification tendencies. Studies One, Two and Three all informed the design of the final study (Study Four, Chapter Seven) which examined the mediating effect of climate change mitigation threat on the relationship between our multidimensional model of ideology (RWA and SDO) and climate change denial.

Summary of Empirical Findings

The aim of this thesis was to examine the role of climate change mitigation threat in the right-wing tendency to deny climate change. Therefore, I sought to answer four research questions across four empirical studies. These questions were:

1. What are community salient beliefs about climate change, cause, impact, and scientific evidence? (answered in Study One)

2. Would an existing climate change denial questionnaire, which dealt with concerns raised in the findings of Study One, demonstrate adequate reliability and item variance so as to be used as a measure of the climate change denial outcome variable in Study Four? (answered in Study Two).
3. Does Belief in a Dangerous World, a system threat variable, mediate the relationship between right-wing ideology and system justification tendencies? (answered in Study Three)
4. Does Climate Change Mitigation Threat mediate the relationship between right-wing ideology and Climate Change Denial types? (answered in Study Four)

The following subsections present summaries of each study and how these findings addressed each research question.

Study One: Community Understanding of Climate Change and Denial

Study One was an elicitation study that was conducted to assist in the construction or adoption of items for climate change denial scales, to be used in the final thesis study. This was done to address a lack of formative work in the literature examining community understanding of and beliefs about climate change with the aim to use such data to assist in scale construction.

Findings from this elicitation work lead to three important considerations for the development of a climate change denial scale. These were:

- **Use the term “climate change” instead of “global warming” in item construction**
- given that some participants saw global warming as a component of climate change, and a less accurate descriptor of the phenomenon, the term “climate change” appears more suitable to use.

- **Avoid Knowledge-Based Items** - Although participants could identify that fossil fuel use and carbon emissions are a major factor in the cause of climate change, few participants explicitly identified the mechanisms that connect the two.
- **Create Climate Change Denial Sub-factors** - Not all participants believed that humans contribute to the phenomenon of rising temperatures, while some believed that climate change is a term that implies a phenomenon caused by humans. Furthermore, there were mixed reactions with respect to the impacts of climate change and perceived risk. This would appear to suggest that only asking about the existence of climate change is likely to result in misleading outcomes that are difficult to meaningfully interpret. Therefore, a multifactorial measure of climate change denial was sought out.

Study Two: Climate Change Denial Questionnaire Development and Pilot Testing

The aim of the pilot study was to examine scale reliability and item variance of a climate change denial scale published after the completion of Study One (Häkkinen & Akrami, 2014). This scale appeared to address issues raised in the Study One findings. The findings from the pilot study supported the continued use of the Climate Change Denial scale as a multifactorial measure of existence denial, human cause denial, impact denial, and science denial. As such, items 10, 13, and 15 were omitted, and the wording of item 14 was changed to omit mention of “degrees” alluding to temperature change so as to adhere to earlier concerns regarding knowledge of climate change. As a result of the work conducted in Studies One and Two, a reliable and balanced climate change denial scale was created to be used in Study Four.

Study Three: The Role of System Threat in the Right-Wing Tendency to System-Justify

Study Three aimed to examine the mediating effect of a system threat variable (Belief in a Dangerous World) on the relationship between right-wing ideology and two types of system justification tendency (economic and general). Additionally, by adopting the Dual Process Model conceptualisation of ideology and comparing a model using self-placement ideological orientation (unidimensional model) with two ideological dimensions in RWA and SDO (multidimensional model), the study was able to examine whether there are differential ideological effects on system justification outcomes, to gather a more nuanced understanding of the different ideological underpinnings of the tendency to justify and maintain the status quo.

Although conservative ideological orientation, RWA and SDO all positively related to Belief in a Dangerous World and system-justification tendency outcomes, supporting past studies examining the relationships between these variables (Hennes et al., 2012; Onraet et al., 2013), the path analysis did not reveal a mediation effect for Belief in a Dangerous World on any ideology-system justification relationships.

With respect to the comparison of unidimensional and multidimensional ideological models, variance explained in general system justification was similar across both models, however the multidimensional model explained more variance in economic system justification. The multidimensional model allowed us to compare differential ideological effects on system justification variables. SDO had significant total effects on both system justification outcomes, however RWA had significant total effects on economic but not general system justification.

The findings therefore suggest that, at least at the chronic and individual difference level, one measure of dispositional system threat in Belief in a Dangerous World may not explain why right-wing adherents are more likely to have higher levels of system justification tendency than their left-wing counterparts. Therefore, this finding does not support a System Justification Theory account for the relationship between right-wing ideology and system justification, which suggests that perceived threats to the system results in individuals, and right-wing adherents in particular, to increase their support for the threatened status quo (Hennes et al., 2012).

Study Four: Perceived Mitigation Threat Mediates Effects of Right-Wing Ideology on Climate Change Beliefs.

The aim of Study Four was to extend understanding of the relationship between political ideology and climate change denial by testing the mediating role of climate change mitigation threat. Additionally, this study compared the relative variance explained in a path model containing a unidimensional conceptualisation of ideology and one containing a multidimensional conceptualisation. The study also aimed to examine whether there are differential associations between the two types (RWA, SDO) of ideology and climate change denial outcomes (in the second path model).

Consistent with past research (Häkkinen & Akrami, 2014; Hoffarth & Hodson, 2016; Milfont et al., 2013), ideological orientation, RWA (all factors) and SDO were positively associated with greater levels of climate change denial. Additionally, all ideological variables were positively related to the climate change mitigation threat mediator, which was itself positively related to all climate change denial variables. Importantly, climate change mitigation threat partially mediated the relationships between ideology variables (self-reported ideological orientation, RWA, and SDO) and climate change denial types (existence,

human cause, impact, and science) in both models. This lends provisional support to the System Justification Theory account of climate change denial, that threats to the socioeconomic system from climate change mitigation in part drives climate change denial among right-wing adherents (Feygina et al., 2010). However, while the findings may indicate that climate change denial is, in part, a defensive reaction to a threat to the current socioeconomic status quo, it is possible that this finding is representative of other processes. Another possible explanation for the partial mediating effect of mitigation threat is Solution Aversion (Campbell & Kay, 2014). This approach suggests that because the solutions involved in climate change mitigation often involve increased government regulation, such as carbon pricing and limits to pollution, right-wing adherents and those who endorse free-market ideology are already averse to these mitigation strategies. Therefore, and irrespective of any threat to the system that these solutions may pose, they deny climate change and the need for those solutions (Campbell & Kay, 2014). Other theoretical approaches such as ideologically-motivated reasoning and cultural cognition argue that the way we process information in science domains (such as climate change) is affected by our prior cultural and ideological beliefs (Kahan et al., 2011; Lewandowsky & Oberauer, 2016). In short, we reject scientific findings that threaten our worldview. Here, the mechanism for worldview threat would seem to lie with how much climate change mitigation is perceived to be counter to a person's ideological beliefs. Therefore, while these accounts of right-wing denial are similar in nature, our findings could be interpreted as support for either or all approaches, and as such interpreting the results from the mediation model should be done with caution.

With respect to the path model comparisons comparing the unidimensional and multidimensional ideological models, variance explained in the four climate change denial outcome variables was similar across both. Similarly, there was only a slight difference between variance explained in the mediator (climate change mitigation threat) across both

models. However, the multidimensional model allowed us to compare differential ideological effects on climate change denial variables, and found that the Conventionalism aspect of RWA, and SDO, had significant total effects on all climate change denial outcomes. Aggression and Submission sub-factors of RWA had much smaller, and in almost all cases, nonsignificant effects on all climate change denial outcomes.

Theoretical Implications for Political Ideology Research

Although the multidimensional ideological models in Studies Three and Four did not explain much more variance in the outcomes than the unidimensional model, they illustrated some important differences between the effects of our two ideological dimensions that would not be elucidated using a single-item self-placement measure. With respect to Study Three only RWA was positively related to the belief in a dangerous world mediator when RWA and SDO were allowed to correlate, suggesting that RWA but not SDO might be the right-wing ideological link to chronic system threat perceptions. Furthermore, direct effects for SDO on system justification outcomes were larger than for RWA. With respect to research examining the ideological predictors of system-justifying tendencies and behaviours, these findings suggest that a multidimensional approach elicits a more detailed picture on the right-wing tendency to system-justify.

Similarly with respect to Study Four, while the multidimensional model did not explain much more variance in the outcomes than the unidimensional approach, there were some important differential effects for the ideological variables. SDO and the Conventionalism dimension of RWA (but not Aggression and Submission) uniquely predicted all outcome variables, lending some support to past findings suggesting that right-wing denial of climate change may occur independently through both RWA and SDO (Hoffarth & Hodson, 2016).

Although it was beyond the scope of the thesis to focus on an examination of the ideological sub-factors of RWA and SDO, interesting results were found with respect to the RWA sub-factors in particular. These differences have been alluded to previously and merit mention. The total effects of the RWA dimensions Aggression and Submission in Study Four were comparatively small and, in almost every case, statistically nonsignificant, with Conventionalism the only RWA sub-factor that significantly predicted climate change denial in the path model. This may suggest that Conventionalism, an ideological dimension representing social ideology or a resistance to change, is the most relevant sub-factor of RWA when examining right-wing climate change policy support. This is not to say that Submission and Aggression are ideological sub-factors not worthy of examination, however if the practicalities of study design do not allow for a more expansive look at these ideological effects then it is recommended that Conventionalism should be the primary RWA sub-factor of interest.

These findings provide a more detailed understanding of the ideological effects of climate change denial. The multidimensional model of ideology uncovers the complexity of the ideology-climate change denial relationship by way of illustrating the different ideological paths to denial, through climate change mitigation threat. Such effects could be replicated in other polarised policy areas where system threat may be a factor. In particular, issues involving acceptance of scientific evidence may be specifically amenable to the multidimensional approach, given the finding in this study that the effect of Conventionalism on climate science denial was stronger than for SDO.

Theoretical Implications for System Justification Theory

Study Three found that system threat did not mediate the relationship between right-wing ideology and system-justifying tendencies, which challenges the SJT claim that both chronic

perceived system threat should lead individuals and right-wing adherents in particular to system-justify. The role of threat in the right-wing tendency to system-justify may be a process that largely occurs situationally and with respect to the threatening context, as opposed to chronic threat perception being the right-wing path to system justification. Indeed, most evidence of the role of threat in system justification come from studies which used threat manipulations (Jost et al., 2005; Kay et al., 2005; Ullrich & Cohrs, 2007; Wakslak et al., 2011) as opposed to measures of chronic threat in the individual. These threat manipulations usually involve a passage describing a threats to the security or safety of the system, or a decline in social, economic and political conditions. The system-justifying tendency may be more likely to be activated in right-wing adherents in the case of salient threats rather than a general heightened level of threat perception. As Study Three was the first study to examine the role of dispositional threat perception and system-justifying tendencies with respect to right-wing ideology, it may be that system justification only occurs in a threat context rather than manifesting as a stable tendency in response to a relatively stable threat perception tendency. This suggests that while threat did not explain the right-wing tendency to system-justify, it is possible that a specific type of threat may engage a specific type of system justifying behaviour. Indeed, findings from the fourth study examining the role of a specific threat in climate change mitigation threat partially explained the right-wing tendency to deny climate change, thereby reducing the need for system-threatening climate change mitigation and maintaining the socioeconomic status quo. It is important to note, however, that even this effect, while significant, was small ($\beta = .09 - .14$). In their totality, these results lend weak support at best for the SJT argument that ideological differences in climate change denial are driven by the threat posed by mitigation efforts. Furthermore, and as mentioned earlier, due to the nature of the data collected and the analyses conducted, it is difficult to conclude that these findings offer support for an SJT

account for climate change denial, given that these findings could be interpreted as representing solution aversion (Campbell & Kay, 2014) or ideologically-motivated reasoning (Lewandowsky & Oberauer, 2016).

Implications for Climate Change Denial Research

Although there were no substantial differences in effect sizes for the prediction of the four climate change denial types, they were nonetheless independent (but strongly related) outcome variables. Given what is known with respect to the tendency to deny different types of denial (for instance, denying that climate change will result in negative impacts, yet accept that humans are at least partially to blame for it), the multifactorial approach to climate change may be suitable in future studies investigating the interplay between these different climate change denial types.

Similarly, that both RWA and SDO uniquely predict climate change denial types suggests that there are at least two different right-wing ideological routes to denial that should be further investigated when attempting to understand the ideological antecedents of denial. However, given that there were only weak effects for climate change mitigation threat on the relationship between right-wing ideology and climate change denial, other approaches to understand this relationship may need to be considered. For example, a fruitful approach may be to consider the ideological aversion to specific climate change mitigation solutions as a factor in climate change denial (Campbell & Kay, 2014). It is possible that right-wing adherents who do not see climate change mitigation as a system threat per se still have negative attitudes towards certain types of mitigation such as carbon pricing and regulatory frameworks that put limits on businesses and the free market. Such an approach also has the advantage of examining, in some detail, the relative ideological effects on the myriad

solutions to climate change, and may highlight the need to tailor solutions to certain regions and populations that do not support such impositions on the market.

Practical Implications for Engaging Community about Climate Change

If climate change denial in right-wing adherents is partially driven by a perception that mitigation strategies such as carbon taxes and transferring to a fossil fuel free energy system are threatening to the socioeconomic system, then it is possible that these mitigation types will simply remain unappealing unless a change in their perceived threat occurs. One strategy might be to focus on the system-maintaining aspects of mitigating climate change. Preventing increases in global average temperatures will mitigate the worst effects of climate change, such as displacement of populations that will put pressure on societies less affected by the impacts of rising sea levels. Furthermore, mitigating climate change also has the effect of maintaining a long-term standard of living and national security, which will all be affected by climate change. As such, instead of highlighting the broader catastrophic environmental effects of climate change and the need for mitigation to limit these, pitching climate change mitigation as a way of reducing specific threats to the system may be more persuasive for right-wing adherents.

On the other hand, the focus could switch to selling policies that are less normatively threatening to the socioeconomic practices, such as incentives for individuals and businesses to switch to green energy, purchasing of solar panels, divesting from fossil fuel companies, and other economic participation options that are individual acts not mandated by the government. Although these approaches alone are unlikely to halt average temperature increases in a timely manner, it may at least begin to change the normative socioeconomic practices around the reliance on fossil fuels in segments of societies that are particularly ideologically opposed to stronger, government-mandated measures such as carbon taxes.

Limitations of the Research and Future Directions

As qualitative and correlational research methods were used in studies reported in this thesis, causal relationships between variables cannot be asserted. This is particularly important to note with respect to Study Four, and in particular the assumed directionality of the statistical mediation. While the decision to consider climate change mitigation threat as a mediator was based on theoretical considerations, it is possible that climate change denial among right-wing adherents is driving their level of perceived climate change mitigation threat, as opposed to mitigation threat driving denial. Beliefs that climate change mitigation policies are threatening the socioeconomic status quo could act as a post-hoc justification for denying climate change.

Studies One, Two and Three only sampled participants from Australia, whereas Study Four, which investigated climate change denial, included only participants from the United States. As such there is a clear national and cultural bias in the sampling that means it is difficult to generalise the findings to other nations and cultures with different socio-political contexts, and different core attitudes to the environment and climate change. As such, interpretation of these findings needs to take into account the specificity of the national and cultural samples. Future research should address the lack of research comparing climate change attitudes and their political correlates across nations to gather a broader sense of the effect of politically-motivated reasoning in the climate change domain. This would also help to elicit a better understanding of the specific political contexts and variables that give rise to polarisation. For instance, comparing the relative level of climate change denial in right-wing political parties, leaders and partisans across national and cultural political contexts to examine the top-down effects of party and leader stances regarding climate change on partisan supporters.

With respect to partisanship, studies presented in this thesis did not examine, or control for, the effects of partisan identity on climate change denial, and instead focused on political ideology. Although this approach was justified in Chapter Five, given that focusing only on political partisans excludes independents that are ideological, it is nonetheless a known factor (Hornsey et al., 2016). Disentangling the psychological antecedents and consequences of political ideology and political partisanship may be a worthy approach to gain a deeper understanding of the political dimension of climate change denial. For example, although an individual might be ideologically right-wing, they may not have a strong right-wing partisan identity and therefore the level of climate change denial may be lower as a result, as they are potentially less likely to follow the cues of right-wing party positions. It also could be that partisanship and ideology, as related but unique variables, may have additive effects on denial. Additionally, the psychological mechanisms that lead both right-wing partisans and ideological adherents to denial may be different, and therefore there is utility in understanding these differences to further understand the drivers of policy support.

By extension of the previous point, examining the influence of not just political party identification (partisan identity) but also ideological identification (i.e. identification as a conservative) would be another important step to disentangle the multitude of political and ideological variables that are contributing to climate change denial. Furthermore, given the various theoretical approaches positing ideological and identification processes for climate change denial (McCright & Dunlap, 2011a), as well as the data supporting an account that both processes are at play (Hornsey et al., 2016), future research could examine the relative contribution of ideological identity and ideological beliefs on the tendency to not only deny climate change but also support for mitigation.

Finally, the SJT approach to climate change denial necessitated that denial be considered a system-justifying behaviour. However, given the nature of our study design it is

difficult to conclude that participants high in climate change denial and high in perceived mitigation threat are denying climate change as a way to protect the system from threat. It is possible that mitigation threat is driving denial through solution aversion (Campbell & Kay, 2014) That is, mitigation strategies such as carbon taxes and regulating fossil fuel use do not appeal to right-wingers on the basis of ideological incongruence, not exclusively because of a heightened need to justify the system. As mentioned earlier, it may be possible to not perceive ideologically-incongruent climate change mitigation solutions as threatening, yet have a negative opinion of them primarily as a function of that incongruence. As an example, a right-wing adherent who supports reduced government intervention may not perceive a price on carbon as threatening to the socioeconomic status quo, but may feel as though it is an intrusion into the market that represents a challenge to their core ideological beliefs.

Concluding Remarks

This thesis sought to understand the underlying psychological processes in the right-wing denial of climate change, using a multidimensional model of ideology (Dual Process Model) to gather a more nuanced understanding of the ideological effects on climate change denial. This is particularly valuable given the politically-polarised nature of climate change at both the community and policy level, and the urgent need to reduce fossil fuel emissions to prevent average global temperatures passing a dangerous point. A System Justification Theory approach was adopted to examine the explanatory role that heightened levels of perceived threat that climate change mitigation poses to the socioeconomic status quo has on this ideology-climate change denial relationship. The results presented in this thesis provide evidence that the threat to the socioeconomic system presented by common policy-level mitigation solutions such as carbon taxes and reduction in fossil fuel use for energy may partially explain the tendency to right-wing adherents to deny climate change. If right-wing adherents are denying climate change in part to avoid solutions that are perceived to be

system-threatening, this may indicate that the way mitigation policies are framed is important in terms of gathering support across the political spectrum in general. Specifically, given that both types of right-wing ideology (conventionalism and SDO) were significant predictors of climate change denial and were both partially mediated, it is possible that different approaches regarding the communication and justification of policy are needed to appeal to these different types of right-wing adherents.

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Appendix A

Ethics Approval, Plain Language Statements and Consent Forms for Studies



Memo

To:	Dr Janine Webb School of Psychology
From:	Secretary – HEAG-H Faculty of Health
CC:	Edward Clarke
Date:	19 August 2013
Re:	HEAG-H 102_2013: The relationship between ideology, system justification and climate change denial: A qualitative study

Approval has been given for Dr Janine Webb, School of Psychology, to undertake this project for a period of 1 year from 19 August, 2013. The current end date for this project is 19 August 2014.

The approval given by the Deakin University HEAG - H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

An Annual Project Report Form can be found at:

<http://www.deakin.edu.au/hmnbs/research/ethics/ethicssubmissionprocess.php>

This should be completed and returned to the Administrative Officer to the HEAG-H, Pro-Vice Chancellor's office, Faculty of Health, Burwood campus by **Tuesday 19th November, 2013** and when the project is completed. HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Good luck with the project!

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO:

Plain Language Statement

Date:

Full Project Title: The relationship between ideology, system justification, and climate change denial: A Qualitative Study

Principal Researcher: Dr. Janine Webb

Student Researcher: Edward Clarke

Associate Researcher(s):

Purpose

You are invited to participate in this project which aims to better understand perceptions and experiences of 'climate change' and 'denial' of climate change. These findings will allow us to explore the adequacy of prior research and its conceptualisation and understanding of these concepts.

Expected benefits to the wider community

It is expected that this project will benefit the wider community by improving our understanding of people's perceptions of climate change and aspects of denial of climate change.

Payment

A lottery will be held so that you will have the opportunity to win a \$100 Coles-Myer voucher to compensate you for your time. (One winner will be selected at random).

Funding

This research is totally funded by the School of Psychology at Deakin University.

Demands

By agreeing to participate in this study, you are agreeing to participate in a short, semi-structured interview (approximately half an hour) that will be tape-recorded and then transcribed.

The questions will be open-ended, and the interview will be fairly informal. The questions you will be asked are just prompts for you to describe your perceptions of 'climate change' and 'climate change denial'.

Methods

The interview will be approximately half an hour in length and will take place at Deakin University, or over the phone, at a time mutually agreed upon between the student researcher and yourself. The interviews will be recorded using a digital voice tape recorder. Some notes may also be made during the interview about relevant body language, expressions, pauses or emphasis on wording to assist in the interpretation of interviews.

The emerging data will be transcribed verbatim onto a Microsoft Word document and will be subsequently analysed by the student researcher. The analysis will entail coding the data to identify emerging themes from the interviews.

Risks and potential benefits to participants

The risk of harm to you is not expected to be greater than that experienced in everyday life. However, it is recognized that you may feel uncomfortable having your voice recorded during the interview. Therefore, questions do not have to be answered if you deem them inappropriate, and the interview can be stopped at any time.

Furthermore, due to the nature of qualitative research, some quoting of you, or details of your experiences, will appear in the final paper and any publication of the research. However, these written quotes will not refer to you by name (any names used in the final research paper will be pseudonyms) and no personally identifying information will appear in any publications.

Audio recordings of interviews will be stored separately as soon as they are transcribed, handwritten notes will be shredded once typed out, and any typed data will then be kept on a computer. At the conclusion of the study all data shall be transferred to a CD disk and kept in a secure, locked room at Deakin University. You have the right to review and edit your interview transcript at any time before the conclusion of the study.

How your privacy and confidentiality will be protected

The data collected will be identifiable as your voice and experiences are unique. However, any names used in the final research paper(s) will be pseudonyms, and no personally identifying information will appear and will be treated as confidential. Also, the audio tape recording of your interview will be stored separately as soon as the recording is transcribed, and any handwritten notes will be shredded as soon as they are typed out.

How you can access results of the study, including publications

The research, in a non-identifiable form, will be reported in a PhD thesis and may be presented at a conference. You are able to contact Dr. Janine Webb at the completion of the study for a copy of the results.

The research may also be submitted to a professional journal for publication if deemed appropriate. In this case, you are able to contact Dr. Janine Webb for a copy of the publication.

How the research will be monitored

At all stages of this study, the research will be monitored by Dr. Janine Webb (principal investigator). If you have any queries, complaints or concerns about the research project, you can contact Dr. Janine Webb on (03) 924 43753 or at Janine.Webb@deakin.edu.au.

Provision of services to participants adversely affected by the research

If you have any queries, complaints or concerns about the research project, you can contact Dr. Janine Webb on (03) 924 43753 or at Janine.Webb@deakin.edu.au.

Your rights

You have the right to withdraw from further participation at any stage of the interview, in which case any recordings and transcripts made of your interview will be destroyed straight away and will not be used in the research.

You have the right to decline to answer any questions if you experience discomfort.

You also have the right to personally review your interview transcript and edit it at any stage before analysis.

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Research Integrity, Deakin University, 221 Burwood Highway, Burwood
Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au

Please quote project number [\[201X-xxx\]](#).



PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Mr. Edward Clarke and Dr Janine Webb

Consent Form

Date:

Full Project Title: The relationship between ideology, system justification, and climate change denial: A qualitative study.

Reference Number:

I have read and I understand the attached Plain Language Statement.

I freely agree to participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details, including where information about this project is published, or presented in any public form.

I specifically consent to this interview being tape recorded, in the knowledge that the recording will be deleted as soon as it is transcribed. I am also aware that I have the right to contact the researcher to personally review and edit my transcript at any time before the research is analysed.

Participant's Name (printed)

Signature Date



Memo

To:	Dr Janine McGuinness School of Psychology
From:	Secretary – HEAG-H Faculty of Health
CC:	Edward Clarke
Date:	22 November, 2013
Re:	HEAG-H165_2013 Exploring the relationship between system justification and the dual process model of ideology

Approval has been given for Dr Janine McGuinness, School of Psychology, to undertake this project for a period of 1 year from 22 November, 2013. The current end date for this project is 22 November, 2014.

The approval given by the Deakin University HEAG - H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

An Annual Project Report Form can be found at:

<http://www.deakin.edu.au/hmnbs/research/ethics/ethicssubmissionprocess.php>

This should be completed and returned to the Administrative Officer to the HEAG-H, Pro-Vice Chancellor's office, Faculty of Health, Burwood campus by Tuesday 18th November, 2014 and when the project is completed. HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Good luck with the project!

PLAIN LANGUAGE STATEMENT

TO:

Plain Language Statement

Date:

Full Project Title: Exploring the relationship between system justification and the dual process model of ideology.

Principal Researcher: Dr Janine McGuinness

Student Researcher: Edward Clarke

Associate Researcher(s):

Purpose

You are invited to participate in this project which aims to better understand the relationship of people's support for current social systems in society to their political beliefs.

Expected benefits to the wider community

It is expected that this project will benefit the wider community as it will assist us in future studies to examine issues such as the effect of ideology on types of climate change belief.

Payment

A lottery will be held so that you will have the opportunity to win a \$100 Coles-Myer voucher to compensate you for your time. (One winner will be selected at random).

Funding

This research is totally funded by the School of Psychology at Deakin University.

Demands

By agreeing to participate in this study, you are agreeing to complete a questionnaire that will take no more than half an hour to complete. Items in the questionnaire will typically ask you to indicate your level of agreement to certain statements, such as "In general, you find society to be fair."

Methods

The questionnaire will take approximately 20 minutes to complete, and will be conducted online. The questionnaire will ask you some demographic questions, and will also ask you to indicate your level of agreement to a number of different statements measuring ideological belief, such as “If people work hard, they almost always get what they want.”

The questionnaire is completely voluntary and anonymous and it is important that you do not include any identifying features about yourself in the questionnaire so that we, nor anybody else, will be able to link this information to you.

Risks and potential benefits to participants

The risk of harm to you is not expected to be greater than that experienced in everyday life.

How your privacy and confidentiality will be protected

Only researchers associated with this project will have access to the collected data, and it is kept in secure storage for 5 years, in line with Deakin University regulations. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report, as only anonymous, aggregated data will be reported.

You will be offered the opportunity to be included in a lottery to win a \$100 Coles-Myer gift voucher at the end of the survey. Your email address will be collected at the completion of the questionnaire, on the last page. However, these addresses will be stored separately from the data and destroyed subsequent to the drawing of the lottery so as to keep your questionnaire responses anonymous. The lottery will be conducted by an independent staff member in the School of Psychology. No other incentives will be provided.

How you can access results of the study, including publications

The research, in a non-identifiable form, will be reported in a PhD thesis and may be presented at a conference. You are able to contact Dr. Janine McGuinness at the completion of the study for a copy of the results.

The research may also be submitted to a professional journal for publication if deemed appropriate. In this case, you are able to contact Dr. Janine Webb for a copy of the publication.

How the research will be monitored

At all stages of this study, the research will be monitored by Dr. Janine McGuinness (principal investigator). If you have any queries, complaints or concerns about the research project, you can contact Dr. Janine McGuinness on (03) 924 43753 or at Janine.Webb@deakin.edu.au.

Provision of services to participants adversely affected by the research

If you have any queries, complaints or concerns about the research project, you can contact Dr. Janine McGuinness on (03) 924 43753 or at Janine.Webb@deakin.edu.au.

Your rights

You have the right to withdraw from further participation at any stage of the survey, in which case any responses to questions will be deleted straight away and will not be used in the research.

You have the right to decline to answer any questions if you experience discomfort.

You also have the right to personally review your responses and edit it at any stage before analysis.

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Research Integrity, Deakin University, 221 Burwood Highway, Burwood
Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au

Please quote project number [\[2013-165\]](#).



Memo

To:	Dr Janine McGuinness, Dr Ben Richardson School of Psychology
From:	Secretary – HEAG-H Faculty of Health
CC:	Edward Clarke
Date:	5 October 2015
Re:	HEAG-H 137_2015: The Relationship between Ideology and Climate Change Belief

Approval has been given for Dr Janine McGuinness and Dr Ben Richardson, School of Psychology, to undertake this project for a period of 1 year from 5 October, 2015. The current end date for this project is 5 October, 2016.

The approval given by the Deakin University HEAG - H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

An Annual Project Report Form can be found at:

<http://www.deakin.edu.au/hmnbs/research/ethics/ethicssubmissionprocess.php>

This should be completed and returned to the Administrative Officer to the HEAG-H, Pro-Vice Chancellor's office, Faculty of Health, Burwood campus by **Tuesday 17th November, 2015** and when the project is completed. HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Good luck with the project!

PLAIN LANGUAGE STATEMENT

Full Project Title: The Relationship between Ideology and Belief in Climate Change (Pilot Study)

Principal Researchers: Mr Edward Clarke (PhD candidate), Dr Janine McGuinness, & Dr Ben Richardson.

Thank you for following up on our invitation to seek more information regarding our study, we truly appreciate your interest. Please read on for a description of our study, after which you are invited to participate.

Purpose

This pilot study intends to examine the internal consistency of an existing climate change belief scale, as well as assist in the development of two climate change threat scales.

Demands

This study will utilize a 10-minute online questionnaire, hosted on a Deakin server. This questionnaire will contain items pertaining to your beliefs and perceptions with respect to climate change and related concepts.

Risks and Benefits

No risks are anticipated for any participants. As this study will aid in the development of scales that will be used in future studies on the topic of ideology and belief in climate change, the benefits to any individual participant are likely to be extremely indirect.

Privacy and Confidentiality Protection

Your responses will be collected in a wholly anonymous format, so your privacy and confidentiality is assured.

Data from this study will be stored for a minimum of 5 years, according to Deakin's protocols, before being permanently destroyed. Until then, digital data will be stored on Deakin's secure server.

Dissemination of Results

It is the intent of the research team to publish averaged findings of this research in peer-reviewed articles, and utilise them in the completion of Edward Clarke's PhD thesis. If you would like to receive a summary of results, please contact Edward at eclarke@deakin.edu.au

Incentives

There are no incentives for this pilot study

Conflicts of interest

The researchers have no conflicts of interest to declare.

Your Rights

This is a voluntary study, so you should feel under no pressure to participate. Further, you may withdraw at any time up to the completion of your online questionnaire. However, as your responses are unidentifiable, your data cannot be removed from analysis upon request once you submit your responses and complete the survey.

More information?

If you want to know more before participating, or just want to find out more about this research please contact: Edward Clarke eclarke@deakin.edu.au

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: (03) 9251 7129, research-ethics@deakin.edu.au

Please quote project number [\[2015-137\]](#).

By clicking the "Begin Survey" button below, you are agreeing that you have read and understood the Plain Language Statement and that you are consenting to participate in this research.

PLAIN LANGUAGE STATEMENT

Full Project Title: The Relationship between Ideology and Belief in Climate Change

Principal Researchers: Mr Edward Clarke (PhD candidate), Dr Janine McGuinness, & Dr Ben Richardson.

Thank you for following up on our invitations to seek more information regarding our study, we truly appreciate your interest. Please read on for a description of our study, after which you are invited to participate.

Purpose

This study intends to investigate the relationship between ideological beliefs, political identification, and beliefs about climate change.

Demands

This study will utilize a 15-minute online questionnaire, hosted on a Deakin server. This questionnaire will contain items pertaining to your ideological beliefs and opinions on social, economic and political issues, identification with ideological groups, as well as your beliefs and perceptions about climate change and related concepts.

Risks and Benefits

No risks are anticipated for any participants. Any benefits to any individual participant are likely to be only very indirect at most. Results may be published in peer-reviewed journals, therefore findings from this study may be considered by policy-makers interested in environmental attitudes of citizens.

Privacy and Confidentiality Protection

Amazon MTurk will provide the researchers with “Worker IDs” of all participants for the purposes of approving compensation. Worker IDs will not be shared with anyone outside of the research team. Furthermore, MTurk worker IDs will only be collected for the purposes of distributing study compensation and will not be associated with survey responses.

Data from this study will be stored for a minimum of 5 years, according to Deakin’s protocols, before being permanently destroyed. Until then, digital data will be stored on Deakin’s secure server.

Dissemination of Results

It is the intent of the research team to publish averaged findings of this research in peer-reviewed articles, and utilise them in the completion of Edward Clarke's PhD thesis. If you would like to receive a summary of results, please contact Edward at eclarke@deakin.edu.au

Incentives

As a reimbursement for your time and efforts you will receive \$1.50 as dispensed through the Amazon MTurk service.

Conflicts of interest

The researchers have no conflicts of interest to declare. The research is fully funded internally by the School of Psychology.

Your Rights

This is a voluntary study, so you should feel under no pressure to participate. Further, you may withdraw at any time up to the completion of your online questionnaire. However, as your responses are unidentifiable, your data cannot be removed from analysis upon request once you submit your responses and complete the survey.

More information?

If you want to know more before participating, or just want to find out more about this research please contact: Edward Clarke eclarke@deakin.edu.au

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 011 61 3 9251 7129, research-ethics@deakin.edu.au

Please quote project number [2015-137].

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Appendix B

List of Papers and Conference Presentations

Papers:

Clarke, E., Ling, M., Kothe, E., & Richardson, B. (under review). *Perceived Mitigation Threat Mediates Effects of Right-Wing Ideology on Climate Change Beliefs*. Journal of Environmental Psychology. <https://osf.io/3t9tg/>

Conference Presentations:

Clarke, E., & Richardson, B. (2017, April). *Mitigation threat and the relationship between climate change denial and right-wing ideology*. Paper presented at SASP-SPSSI Conference on The Morality of Conflict and Cooperation, Melbourne.

Clarke, E., & Richardson, B. (2016, March). *Mitigation threat and the relationship between climate change denial and ideology*. Paper presented at the Society of Australasian Social Psychologists (SASP) Conference, Brisbane.

Clarke, E. (2015, April). *Investigating the relationships between types of system justification, threat, and a two-dimensional model of conservatism*. Paper presented at the Society of Australasian Social Psychologists (SASP) Conference, Newcastle.

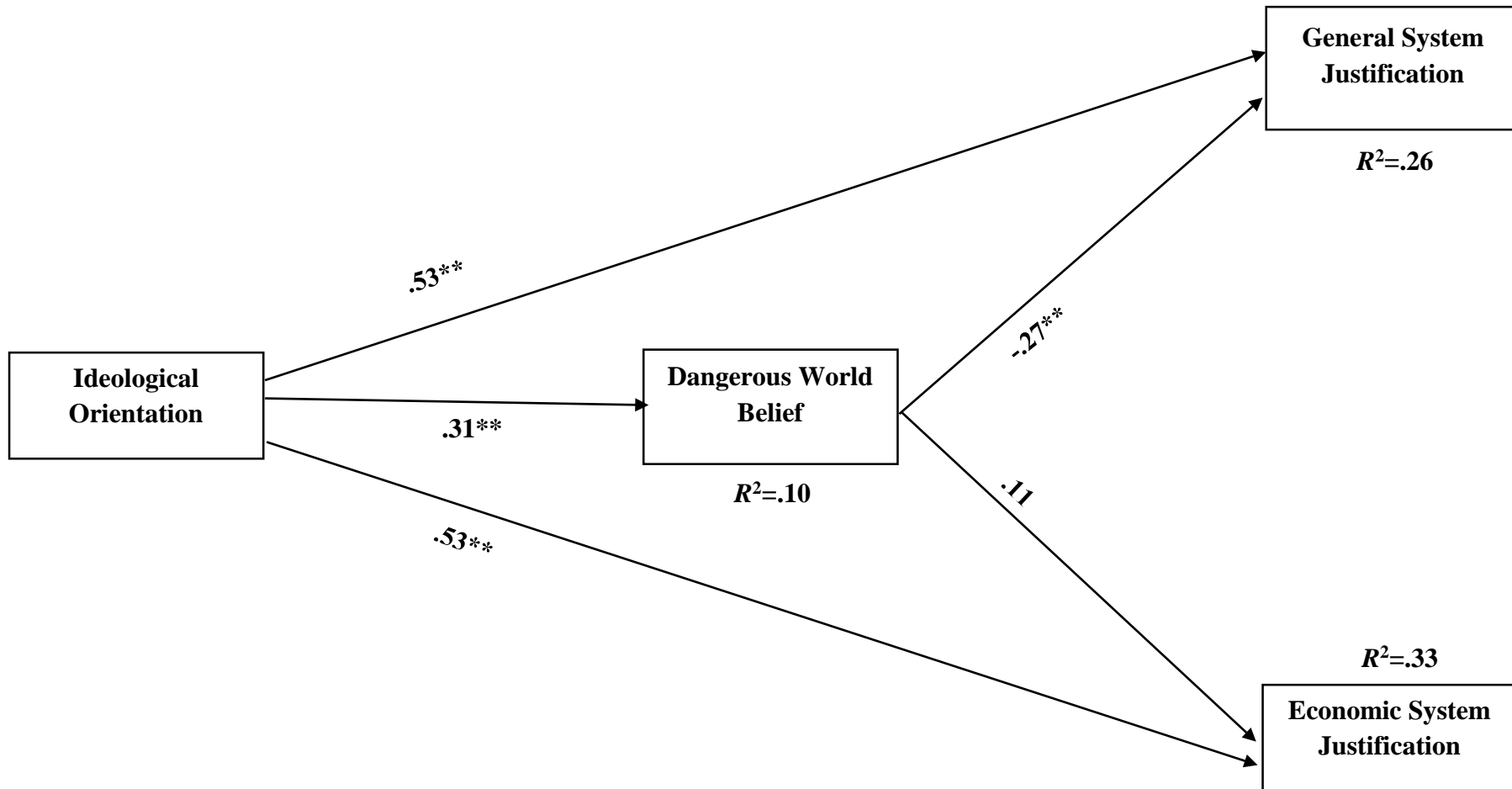
Clarke, E. & McGuinness, J. (2014, July) *Subjective beliefs and perceptions regarding climate change and climate change denial: A qualitative study*. Poster presented at the International Society of Political Psychologists (ISPP) Conference, Rome.

Clarke, E. & McGuinness, J. (2014, April) *Subjective beliefs and perceptions regarding climate change and climate change denial: A qualitative study*. Paper presented at the Society of Australasian Social Psychologists (SASP) Conference, Canberra.

Appendix C

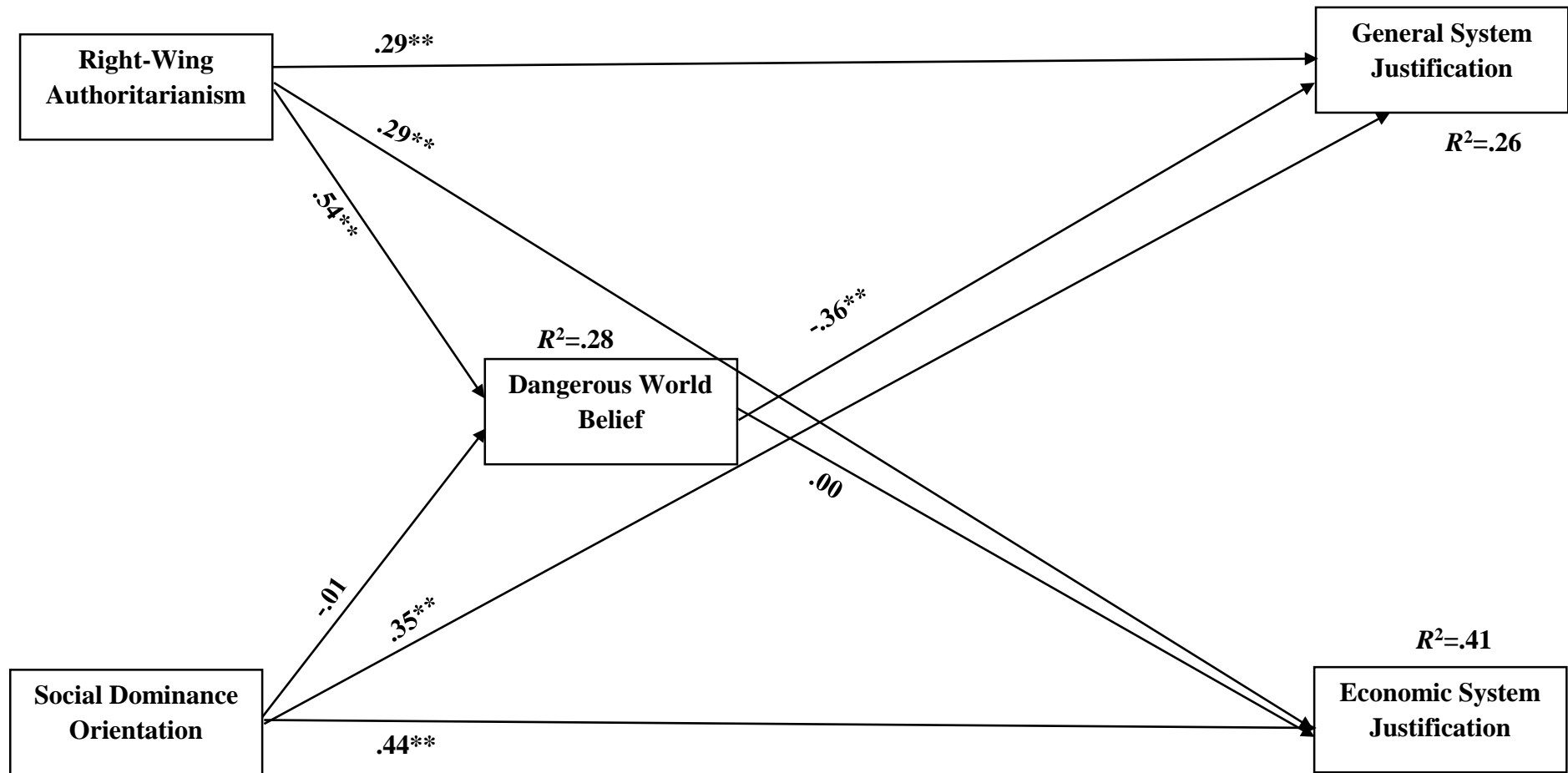
C.1 Path Models for Study Three

Path model for unidimensional model



Saturated mediation model predicting general system justification and economic system justification. All residuals of outcome variables were allowed to correlate. $**p < .01$

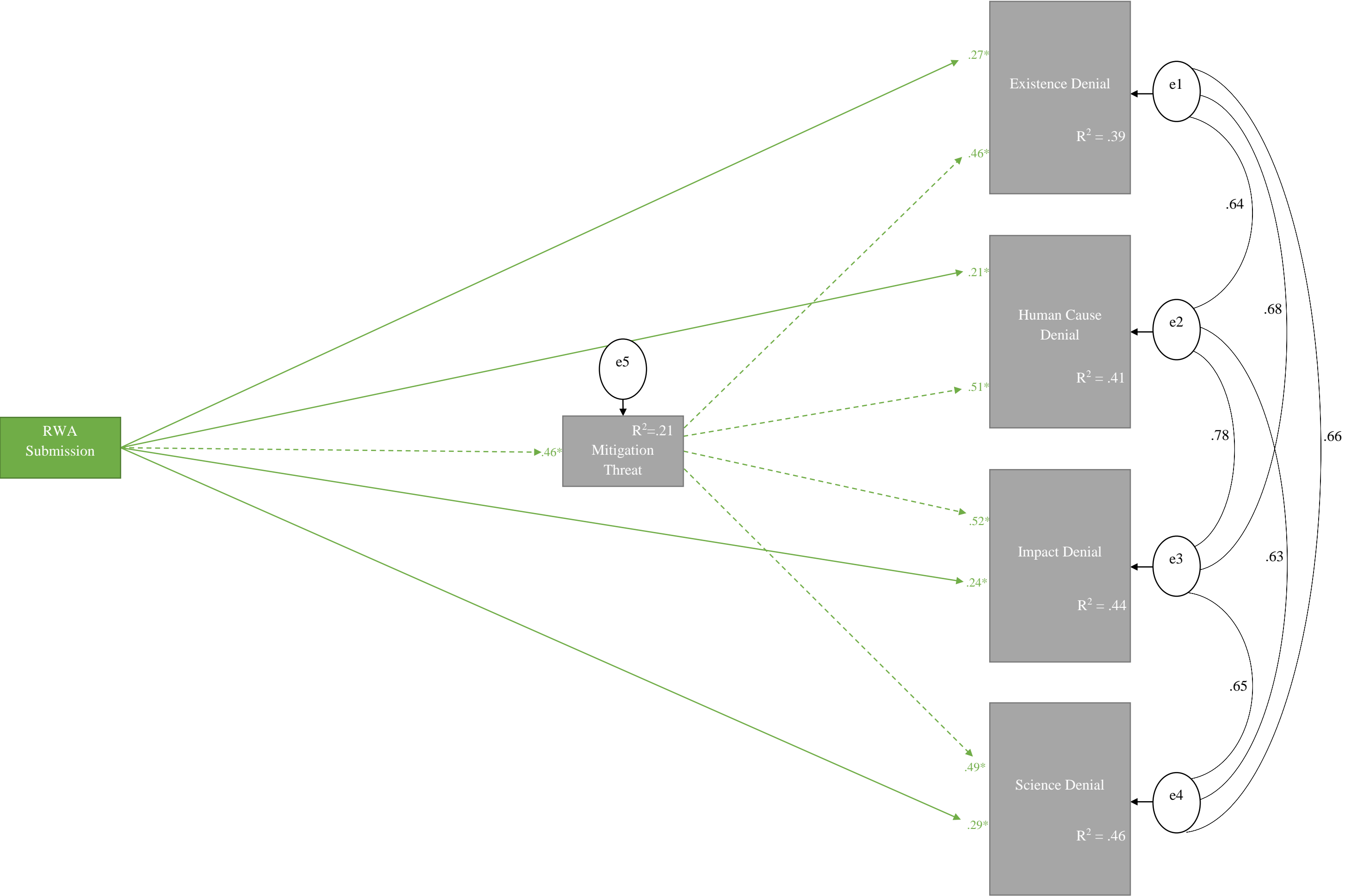
Path model for multidimensional model



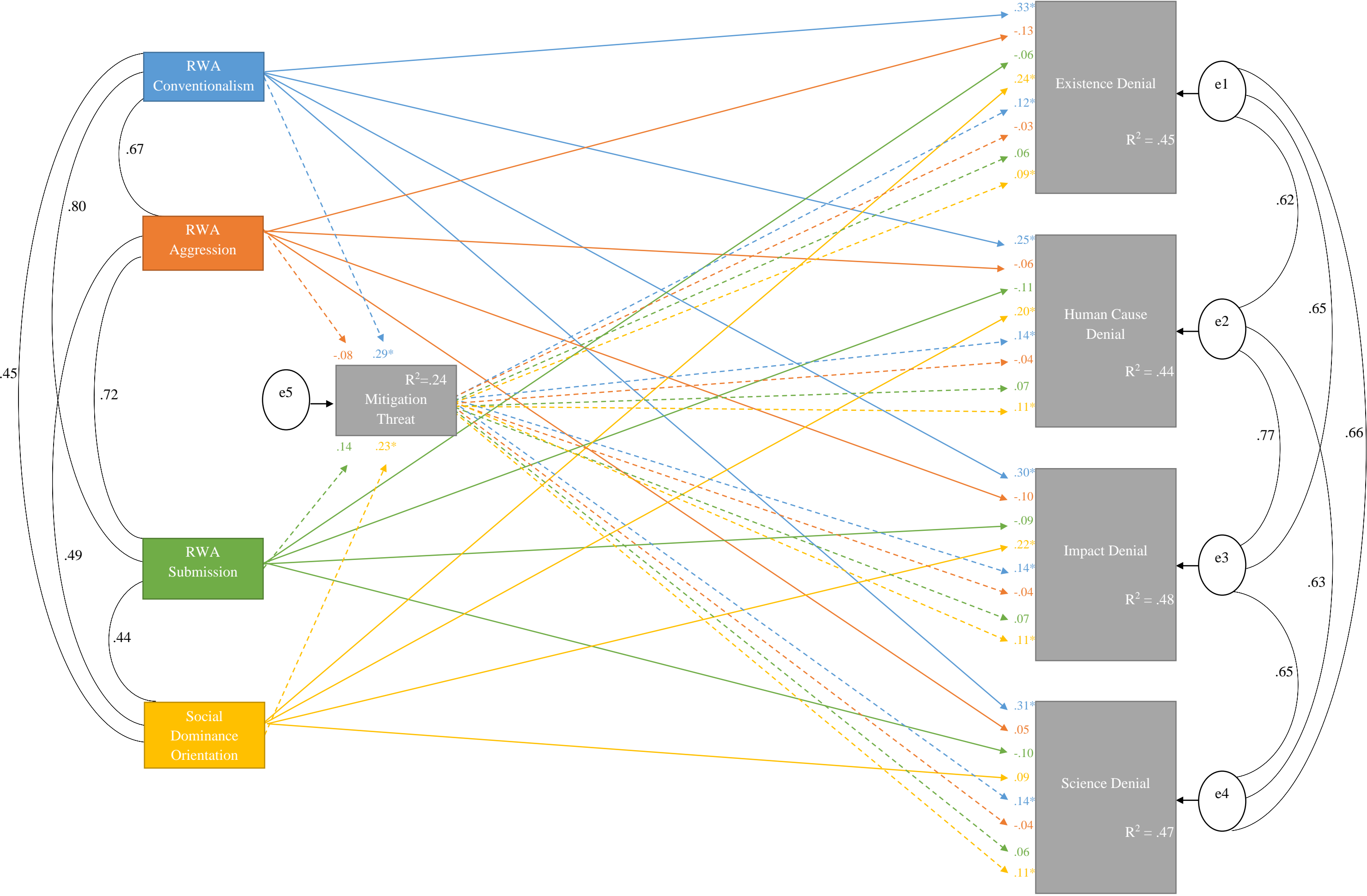
Saturated mediation model predicting general system justification and economic system justification. All residuals of outcome variables were allowed to correlate, and predictor variables were also allowed to correlate. $^{**}p < .01$

C.2 Path Models for Study Four

Path model for unidimensional model (* $p < .05$)



Path model for multidimensional model (* $p < .05$)



Appendix D

D.1 Interview Materials for Study One

1. What is your age?
2. What is your gender?
3. What is your current occupation?
4. What is your highest level of education attained?
5. Please describe what comes to mind when you hear the term ‘climate change’
6. Please describe what comes to mind when you hear the term ‘global warming’
7. Please describe what comes to mind when you hear the term ‘climate change denial’
8. Please describe what comes to mind when you hear the term ‘climate change scepticism’
9. What is your belief regarding the existence of climate change?
 - 9a. Have you experienced anything that you believe might be the result of climate change?
If yes, please describe this/these experience(s).
 - 9b. What do you think might be the cause or causes of climate change?
 - 9c. Do you believe that humans are the cause of climate change?
If yes, to what extent?
 - 9d. Do you believe that climate change will lead to dire consequences?
If yes, please describe.
 - 9e. Do you feel empowered to do anything about climate change?
 - 9e. What are your thoughts regarding the nature of the scientific evidence surrounding climate change?
 - 9f. What are your impressions of the media representation of the issue of climate change?

D.2 Questionnaire Materials for Study Two

* denotes reverse-coded items

Gender:

Age:

Climate Change Denial Scale (Häkkinen & Akrami, 2014)

(1 = strongly disagree, 7 = strongly agree)

1. I am not convinced that the Earth's climate has warmed up over the last century.
2. I find it hard to believe that the earth's climate is really changing.
3. My opinion is that Earth's climate shows a pronounced increase in temperature.*
4. I believe that climate change is occurring.*
5. Climate change is a result of human activities such as burning fossil fuels.*
6. Climate change is just a result of natural variation in the climate.
7. Warming of the climate on earth is not due to human influence.
8. The temperature on Earth varies naturally.
9. Human activity is causing changes in the climate*
10. Climate change will affect the Earth negatively*
11. Climate change will not affect the life on Earth in any significant way.
12. My opinion is that we will not even notice the effects of climate change.
13. The so-called "climate threat" is exaggerated.
14. The seriousness of climate change is exaggerated in the media.
15. A few degrees here or there in climate change will not affect life on Earth.
16. Many people underestimate the seriousness of climate change.*
17. I do not believe that scientists are in agreement on the issue of climate change.
18. I believe that there is enough scientific evidence to confirm the changes in Earth's climate.*
19. I think the evidence for climate change is far too weak.
20. Scientific evidence overwhelmingly supports the notion that the climate is changing.*

Climate Change Mitigation Threat Scale.

(1 = strongly disagree, 7 = strongly agree)

1. Attempts by governments to reduce carbon emissions to slow climate change will threaten our economic prosperity.
2. Our way of life will be negatively affected by attempts to slow or reduce the effects of climate change.
3. Efforts to halt greenhouse gas emissions by governments simply drive up energy prices, which decreases my standard of living.
4. Government policies suggested to address climate change such as carbon taxes and caps on pollution threaten my standard of living.
5. Policies to address climate change (such as caps on pollution and carbon taxes) will not cost me much money personally.*
6. Policies to address climate change such as caps on pollution and carbon taxes will not threaten my personal economic and financial prosperity.*
7. Policies to address climate change such as caps on pollution and carbon taxes will not endanger our economy.*
8. A minor increase in the cost of living due to government policies (such as carbon taxes or caps on pollution) does not worry me.*
9. Attempts by governments to reduce carbon emissions to slow climate change will also slow the growth of our economy.
10. Attempts by governments to address climate change only harms my standard of living.

Climate Change Threat Scale

7pt scale. (1 = strongly disagree, 7 = strongly agree)

1. If nothing substantial is done about climate change, it will threaten our way of life.

2. Climate change might seem bad to some, but I am not too concerned. We will figure out a way to deal with it.*
3. The threat of climate change is greater than the supposed short-term economic pain we will face in dealing with it.
4. Climate change may or may not be problem for future generations. Regardless, I do not feel threatened by its effects in the here and now.*
5. I find climate change a threat to my way of life.
6. I feel threatened by the prospect of climate change and associated environmental effects.
7. I feel climate change will not affect me or my family in the near future.*
8. Climate change threatens the very existence of humanity.
9. Although the major effects of climate change may not happen in my life time, it is still a grave threat to humanity.
10. Climate change may affect the environment, but it does not threaten human existence.*
11. Climate change may affect the environment, but it will not adversely harm my own way of life.*

D.3 Questionnaire materials for Study Three

* denotes reverse-coded items

Gender:

- Male
- Female
- Other

Age in years: [text box]

Occupation: [text box]

Nationality:

- Australian
- Other

What is your highest level of education?

- Did not complete High School
- High School
- Completing TAFE
- TAFE certificate
- Completing Undergraduate
- Undergraduate degree
- Completing Postgraduate
- Postgraduate
- Other

What is your pre-tax household income?

- No income
- less than \$20,000
- \$20,000 to 40,000
- \$40,001 to 60,000
- \$60,001 to 80,000
- \$80,001 to 100,000
- \$100,001 to 120,000
- greater than \$120,000
- Prefer not to say

Which political party best aligns with your values?

- Liberal
- ALP
- Nationals
- Greens
- Family First
- Sex Party
- Palmer United Party
- Other
- Prefer not to say

To what extent are your political beliefs aligned with this party? (1=not at all, 7=strongly aligned)

How strongly do you identify with this party? (1=not at all, 7=strongly identify)

Which party do you usually vote for?

- Liberal
- ALP
- Nationals
- Greens
- Family First
- Sex Party
- Palmer United Party
- Independent
- Other
- My vote changes from election to election
- Prefer not to say

Which party did you vote for in the 2013 Federal election?

- Liberal
- ALP
- Nationals
- Greens
- Family First

- Sex Party
- Palmer United Party
- Independent
- Other
- Prefer not to say

Cultural conservatism (Crowson, 2009) (1=strongly disagree, 7=strongly agree)

1. People who do not work for a living are basically “good-for-nothing”.
2. Working hard makes you a better person.
3. Only when you work for a living, are you a “somebody”.
4. A good parent will make sure his/her children are obedient at all times.
5. Smart parents teach their children who’s “the boss” from an early age.
6. It is better for parents to be strict when raising their children.
7. It would be better for society if the woman would take care of the home and the husband earn the money.
8. A woman is more suited to raise small children than a man.
9. It is always better for a woman to stay at home with her children when they are small.
10. Unmarried young people do not do anything wrong when they sleep together.*
11. A doctor should be allowed to end a person’s suffering if the patient explicitly asks for it.*
12. Abortion should remain illegal under all circumstances.

Economic conservatism (Crowson, 2009) (1=strongly disagree, 7=strongly agree)

1. The wealthy have an unfair advantage in our society
2. Taxes on high incomes should be increased. *
3. The government should never penalize big businesses for seeking ways to maximize their profits.
4. Labor unions are a huge benefit to workers.*
5. Big businesses enrich themselves at the expense of the workers.

6. Class differences ought to be smaller than what they are today.*
7. The government should take actions to decrease income differences.*
8. Differences between high and low incomes should remain as they are.
9. Our country can only get ahead if the government gives the industry free reign to control its own affairs.

General System Justification Scale (Kay & Jost, 2003) (1=strongly disagree, 7=strongly agree)

1. In general, you find society to be fair
2. In general, the Australian political system operates as it should
3. Australian society needs to be radically restructured*
4. Australia is the best country in the world to live in
5. Most policies serve the greater good
6. Everyone has a fair shot at wealth and happiness
7. Our society is getting worse every year*
8. Society is set up so that people usually get what they deserve

Economic System Justification Scale (Jost & Thomson, 2000) (1=strongly disagree, 9=strongly agree)

1. If people work hard, they almost always get what they want
2. The existence of widespread economic differences does not mean that they are inevitable*
3. Laws of nature are responsible for differences in wealth in society
4. There are many reasons to think that the economic system is unfair*
5. It is virtually impossible to eliminate poverty
6. Poor people are not essentially different from rich people*

7. Most people who don't get ahead in our society should not blame the system. They have only themselves to blame
8. Equal distribution of resources is a possibility for our society*
9. Social class differences reflect differences in the natural order of things
10. Economic differences in the society reflect an illegitimate distribution of resources*
11. There will always be poor people, because there will never be enough jobs for everybody
12. Economic positions are legitimate reflections of people's achievements
13. If people wanted to change the economic system to make things equal, they could*
14. Equal distribution of resources is unnatural
15. It is unfair to have an economic system which produces extreme wealth and extreme poverty at the same time*
16. There is no point in trying to make incomes more equal
17. There are no inherent differences between rich and poor; it is purely a matter of the circumstances into which you are born*

Democratic System Justification Scale (Rutto, Russo & Mosso, 2013) (1=strongly disagree, 7=strongly agree)

1. In general, I believe that our democratic system is fair
2. In general, the Australian political system operates as it should
3. The Australian political system needs to be radically restructured*
4. Our democratic system is the best possible
5. Most policies serve the collective good
6. Politics is constructed in a mode that is best to move forward
7. Parties represent the different souls of society
8. Today politicians act more in favour of lobby groups than of the citizens*

Social Dominance Orientation Scale (Pratto, Sidanius, Stallworth & Malle, 1994)

(1=strongly disagree, 7=strongly agree)

1. Some groups of people are simply inferior to other groups.
2. In getting what you want, it is sometimes necessary to use force against other groups.
3. It's OK if some groups have more of a chance in life than others.
4. To get ahead in life, it is sometimes necessary to step on other groups.
5. If certain groups stayed in their place, we would have fewer problems.
6. It's probably a good thing that certain groups are at the top and other groups are at the bottom.
7. Inferior groups should stay in their place.
8. Sometimes other groups must be kept in their place.
9. It would be good if groups could be equal.*
10. Group equality should be our ideal.*
11. All groups should be given an equal chance in life.*
12. We should do what we can to equalize conditions for different groups.*
13. Increased social equality.*
14. We would have fewer problems if we treated people more equally.*
15. We should strive to make incomes as equal as possible.*
16. No one group should dominate in society.*

Items 9-16 should be reverse-coded.*

Right wing Authoritarianism (Altemeyer, 1998) – (-4 = strongly disagree, 4 = strongly agree)

1. The established authorities generally turn out to be right about things, while the radicals and protestors are usually just “loud mouths” showing off their ignorance
2. Women should have to obey their husbands when they get married

3. Our country desperately needs a mighty leader who will do what has to be done to destroy the radical new ways and sinfulness that are ruining us
4. Gays and Lesbians are just as healthy and moral as anybody else*
5. It is better to trust the judgement of the proper authorities in government and religion than to listen to the noisy rabble-rousers in our society who are trying to create doubt in people's minds
6. Atheists and others who have rebelled against the established religions are no doubt every bit as good and virtuous as those who attend church regularly*
7. The only way our country can get through the crisis ahead is to get back to our traditional values, put some tough leaders in power, and silence the troublemakers spreading bad ideas.
8. There is absolutely nothing wrong with nudist camps*
9. Our country needs free thinkers who have the courage to defy traditional ways, even if this upsets many people*
10. Our country will be destroyed someday if we do not smash the perversions eating away at our moral fibre and traditional beliefs
11. Everyone should have their own lifestyle, religious beliefs, and sexual preferences, even if it makes them different from everyone else.*
12. The "Old-fashioned ways" and "old-fashioned values" still show the best way to live.
13. You have to admire those who challenged the law and the majority's view by protesting for women's abortion rights, for animal rights, or to abolish school prayer*
14. What this country really needs is a strong, determined leader who will crush evil, and take us back to our true path.
15. Some of the best people in our country are those who are challenging our government, criticising religion and ignoring the "normal way things are supposed to be done"*
16. God's laws about abortion, pornography and marriage must be strictly followed before it is too late, and those who break them must be strongly punished.
17. There are many radical, immoral people in our country today who are trying to ruin it for their own godless purposes, who the authorities should put out of action.
18. A "woman's place" should be wherever she wants to be. The days when women are submissive to their husbands and social conventions belong strictly in the past*
19. Our country will be great if we honour the ways of our forefathers, do what the authorities tell us to do, and get rid of the "rotten apples" who are ruining everything
20. There is no "ONE right way" to live life; everybody has to create their own way.*
21. Homosexuals and feminists should be praised for being brave enough to defy "traditional family values"*

22. This country would work a lot better if certain groups of troublemakers would just shut up and accept their group's traditional place in society

Belief in a dangerous World (Duckitt, Wagner, du Plessis & Birum, 2002) (1=strongly disagree, 7=strongly agree)

1. Although it may *appear* that things are constantly getting more dangerous and chaotic, it really isn't so. Every era has its problems, and a person's chances of living a safe, untroubled life are better today than ever before*
2. Any day now chaos and anarchy could erupt around us. All the signs are pointing to it
3. There are many dangerous people in our society who will attack someone out of pure meanness, for no reason at all
4. Despite what one hears about "crime in the street," there probably isn't any more now than there ever has been*
5. If a person takes a few sensible precautions, nothing bad is likely to happen to him or her; we do not live in a dangerous world*
6. Every day as society become more lawless and bestial, a person's chances of being robbed, assaulted, and even murdered go up and up
7. My knowledge and experience tells me that the social world we live in is basically a safe, stable and secure place in which most people are fundamentally good*
8. It seems that every year there are fewer and fewer truly respectable people, and more and more persons with no morals at all who threaten everyone else
9. The "end" is *not* near. People who think that earthquakes, wars, and famines mean God might be about to destroy the world are being foolish*
10. My knowledge and experience tells me that the social world we live in is basically a dangerous and unpredictable place, in which good, decent and moral people's values and way of life are threatened and disrupted by bad people

Need for Closure Scale (Kruglanski, Webster & Klem, 1993) (1=strongly disagree, 7=strongly agree)

1. I think that having clear rules and order at work is essential for success.
2. Even after I've made up my mind about something, I am always eager to consider a different opinion.*
3. I don't like situations that are uncertain.
4. I dislike questions which could be answered in many different ways.
5. I *like* to have friends who are unpredictable.*
6. I find that a well ordered life with regular hours suits my temperament.
7. When dining out, I like to go to places where I have been before so that I know what to expect.
8. I feel uncomfortable when I don't understand the reason why an event occurred in my life.
9. I feel irritated when one person disagrees with what everyone else in a group believes.
10. I hate to change my plans at the last minute.
11. I don't like to go into a situation without knowing what I can expect from it.
12. When I go shopping, I have difficulty deciding exactly what it is that I want.*
13. When faced with a problem I usually see the one best solution very quickly.
14. When I am confused about an important issue, I feel very upset.
15. I tend to put off making important decisions until the last possible moment.*
16. I usually make important decisions quickly and confidently.
17. I would describe myself as indecisive.*
18. I think it is fun to change my plans at the last moment.*
19. I enjoy the uncertainty of going into a new situation without knowing what might happen.*
20. My personal space is usually messy and disorganized.*

21. In most social conflicts, I can easily see which side is right and which is wrong.
22. I tend to struggle with most decisions.*
23. I believe that orderliness and organization are among the most important characteristics of a good student.
24. When considering most conflict situations, I can usually see how both sides could be right.*
25. I don't like to be with people who are capable of unexpected actions.
26. I prefer to socialize with familiar friends because I know what to expect from them.
27. I think that I would learn *best* in a class that *lacks* clearly stated objectives and requirements.*
28. When thinking about a problem, I consider as many different opinions on the issue as possible.*
29. I like to know what people are thinking all the time.
30. I dislike it when a person's statement could mean many different things.
31. It's annoying to listen to someone who cannot seem to make up his or her mind.
32. I find that establishing a consistent routine enables me to enjoy life more.
33. I enjoy having a clear and structured mode of life.
34. I *prefer* interacting with people whose opinions are very different from my own.*
35. I like to have a place for everything and everything in its place.
36. I feel uncomfortable when someone's meaning or intention is unclear to me.
37. When trying to solve a problem I often see so many possible options that it's confusing.*
38. I always see many possible solutions to problems I face.*
39. I'd rather know bad news than stay in a state of uncertainty.
40. I do not usually consult many different opinions before forming my own view.
41. I dislike unpredictable situations.

42. I *dislike* the routine aspects of my work (studies).*

In politics people sometimes talk of left and right. Where would you place yourself?

(0=left, 10=right).

How confident are you about your above placement? (1 = Not at all confident - 7 = Very confident)

D.4 Questionnaire Materials for Study Four

* denotes reverse-coded items

Gender: Male/Female/Other

Age in years: [text box]

Nationality:

- American
- Other: Please specify [text box]

Religion:

Please specify [text box]

- No religion
- Prefer not to say

Which political party do you support?

- Democratic
- Republican
- Other
- Independent/do not support a political party
- Prefer not to say

Highest level of education:

- Did not complete high school
- High school
- Completing undergraduate degree
- Undergraduate degree
- Completing graduate degree
- Graduate degree
- Other (please specify)

Ideological self-placement item:

In politics people sometimes talk of liberal and conservative. Where would you place yourself? (0=extremely liberal, 10=extremely conservative).

Social Dominance Orientation – SDO7 short form (Ho et al., 2015) (1= strongly disagree, 7 = strongly agree)

1. An ideal society requires some groups to be on top and others to be on the bottom.
2. Some groups of people are simply inferior to other groups.
3. No one group should dominate in society.*
4. Groups at the bottom are just as deserving as groups at the top.*
5. Group equality should not be our primary goal.
6. It is unjust to try to make groups equal.
7. We should do what we can to equalize conditions for different groups.*
8. We should work to give all groups an equal chance to succeed.*

Right-Wing Authoritarianism Scale (Funke, 2005) (1= strongly disagree, 7 = strongly agree)

1. People should develop their own personal standards about good and evil and pay less attention to the Bible and other old, traditional forms of religious guidance.*
2. What our country really needs instead of more “civil rights” is a good stiff dose of law and order.
3. The days when women are submissive should belong strictly in the past. A “woman’s place” in society should be wherever she wants to be.*
4. The withdrawal from tradition will turn out to be a fatal fault one day.
5. There is no such crime to justify capital punishment.*
6. Obedience and respect for authority are the most important values children should learn.
7. Homosexual long-term relationships should be treated as equivalent to marriage.*
8. What our country really needs is a strong, determined President which will crush evil and set us on our right way again.
9. It is good that nowadays young people have greater freedom “to make their own rules” and to protest against things they don’t like.*
10. Being virtuous and law-abiding is in the long run better for us than permanently challenging the foundation of our society.
11. It is important to protect the rights of radicals and deviants in all ways.*
12. The real keys to the “good life” are obedience, discipline, and virtue.

Climate Change Threat Scale (1 = strongly disagree, 7 = strongly agree)

1. If nothing substantial is done about climate change, it will threaten our way of life
2. Climate change might seem bad, but I am not too concerned. We will figure out a way to deal with it*
3. Climate change may or may not be problem for future generations. Regardless, I do not feel threatened by its effects in the here and now*
4. I find climate change a threat to my way of life
5. I feel climate change will not affect me or my family in the near future*
6. I feel threatened by the prospect of climate change and associated environmental effects
7. Climate change may affect the environment, but it will not adversely harm my own way of life*
8. Climate change threatens the very existence of humanity
9. Although the major effects of climate change may not happen in my life time, it is still a grave threat to humanity
10. Climate change may affect the environment, but it does not threaten human existence*

Climate Change Mitigation Threat Scale (1 = strongly disagree, 7 = strongly agree)

1. Attempts by governments to slow or reduce the effects of climate change will destabilise the economy.
2. The current economic system will not be threatened by policies to address climate change, such as caps on pollution and carbon taxes.*
3. Moving from a fossil fuel-based energy system to renewables and clean energy will disrupt the existing social order.
4. The current way of life will be negatively affected by attempts by governments to slow or reduce the effects of climate change
5. Policies to address climate change such as caps on pollution and carbon taxes will not endanger the economy*
6. Policies to address climate change (such as caps on pollution and carbon taxes) threatens the current market-based economic system.

7. Moving away from the use of fossil-fuels and toward the use of renewable and clean energy will not disrupt the existing social order*
8. Seriously addressing climate change at the government level threatens the foundations of the existing economic system.
9. Dealing with climate change by decreasing the use of fossil fuels will result in economic instability
10. The current market-based economic system will not be threatened by addressing climate change*
11. Attempts to address climate change by governments will not affect economic stability*
12. Moving from a fossil fuel-based energy system to renewables and clean energy will cause economic instability.

Climate Change Denial Scale (Modified scale based on Häkkinen & Akrami, 2014)

7pt scale. (1 = strongly disagree, 7 = strongly agree)

1. I am not convinced that the Earth's climate has warmed up over the last century.
2. I find it hard to believe that the earth's climate is really changing.
3. My opinion is that Earth's climate shows a pronounced increase in temperature*
4. I believe that climate change is occurring*
5. Climate change is a result of human activities such as burning fossil fuels*
6. Climate change is just a result of natural variation in the climate.
7. Warming of the climate on earth is not due to human influence.
8. Human activity is causing changes in the climate.*
9. Climate change will affect the Earth negatively.*
10. My opinion is that we will not even notice the effects of climate change.
11. The so-called "climate threat" is exaggerated.
12. Life on Earth will be seriously impacted by climate change.*
13. I do not believe that scientists are in agreement on the issue of climate change.
14. I believe that there is enough scientific evidence to confirm the changes in Earth's climate.*
15. I think the evidence for climate change is far too weak.
16. Scientific evidence overwhelmingly supports the notion that the climate is changing*

Economic System Justification Scale (Jost & Thomson, 2000) (1= strongly disagree, 9 = strongly agree)

1. If people work hard, they almost always get what they want
2. The existence of widespread economic differences does not mean that they are inevitable*
3. Laws of nature are responsible for differences in wealth in society
4. There are many reasons to think that the economic system is unfair*
5. It is virtually impossible to eliminate poverty
6. Poor people are not essentially different from rich people*
7. Most people who don't get ahead in our society should not blame the system; they have only themselves to blame
8. Equal distribution of resources is a possibility for our society*
9. Social class differences reflect differences in the natural order of things
10. Economic differences in the society reflect an illegitimate distribution of resources*
11. There will always be poor people, because there will never be enough jobs for everybody
12. Economic positions are legitimate reflections of people's achievements
13. If people wanted to change the economic system to make things equal, they could*
14. Equal distribution of resources is unnatural
15. It is unfair to have an economic system which produces extreme wealth and extreme poverty at the same time*
16. There is no point in trying to make incomes more equal
17. There are no inherent differences between rich and poor; it is purely a matter of the circumstances into which you are born*

Conservative Identification with a Psychological Group Scale (Mael & Tetrick, 1992, as cited in Devine, 2014).

7pt scale (1 = strongly disagree, 7 = strongly agree)

1. When someone criticises conservatives, it feels like a personal insult.
2. I'm very interested in what others think of conservatives.
3. When I talk about conservatives, I usually say "we" rather than "they".
4. Conservatives' successes are my successes.
5. When someone praises conservatives, it feels like a personal compliment.
6. I act like a conservative person to a great extent.

7. If a story in the media criticised conservatives, I'd feel embarrassed.
8. I don't act like a typical conservative person. *
9. I have a number of qualities typical of conservative people.
10. The limitations associated with conservative people apply to me also.

Liberal Identification with a Psychological Group Scale (Mael & Tetrick, 1992, as cited in Devine, 2014).

7pt scale (1 = strongly disagree, 7 = strongly agree)

1. When someone criticises liberals, it feels like a personal insult.
2. I'm very interested in what others think of liberals.
3. When I talk about liberals, I usually say "we" rather than "they".
4. Liberals' successes are my successes.
5. When someone praises liberals, it feels like a personal compliment.
6. I act like a liberal person to a great extent.
7. If a story in the media criticised liberals, I'd feel embarrassed.
8. I don't act like a typical liberal person*
9. I have a number of qualities typical of liberal people.
10. The limitations associated with liberal people apply to me also.

General System Justification Scale (Kay & Jost, 2003) (1= strongly disagree, 7 = strongly agree)

1. In general, you find society to be fair.
2. In general, the American political system operates as it should.
3. American society needs to be radically restructured.*
4. America is the best country in the world to live in.
5. Most policies serve the greater good.

6. Everyone has a fair shot at wealth and happiness.
7. Our society is getting worse every year.*
8. Society is set up so that people usually get what they deserve.

Democratic System Justification Scale - modified (Rutto, Russo & Mosso, 2013) (1= strongly disagree, 9 = strongly agree)

1. In general, I believe that our democratic system is fair
2. The American political system needs to be radically restructured*
3. Our democratic system is the best possible
4. Politics assists us to move forward
5. Political parties represent the different values of society
6. Today politicians act more in favour of lobby groups than of the citizens*