

Unpacking the Adaptive Significance of the Political Spectrum:
Do Liberal and Conservative Ideological Differences Reflect Alternative
Strategies for Obtaining Reciprocity?



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To Rachel and Diane Mansell for your support and patience over the past four years.

Abstract:

In the following thesis I examine the possible evolutionary significance of behavioural differences associated with liberal and conservative ideological orientations. In investigating the evolutionary significance of these two orientations I have two primary research questions. First, how do liberal and conservative oriented individuals differ in their responses to the same socio-environmental stimuli? Second, do differences in their responses to socio-environmental stimuli represent alternative behavioural strategies for social interaction, specifically adaptive strategies to maximize returns from social interactions? To answer these research questions I evaluate how trust and cooperation among liberal and conservative oriented individuals are affected by conditions of social change and inequality. Previous research finds that attitudes and behaviours consistent with the tolerance or intolerance of social change and inequality are strong predictors of ideological orientation across a liberal-conservative scale. Based on a synthesis of behavioural research I construct two theoretical frameworks to account for the adaptive utility associated with a sensitivity to social change and inequality; 1) The Group Reciprocity Hypothesis, and 2) The Social Risk Hypothesis. I test these frameworks using an experimental research design. I predict that, if liberal and conservative orientations are reflective of alternative adaptive strategies to maximize returns from social interaction, then the willingness of liberal and conservative individuals to participate in a social interaction should be differentially affected by conditions related to social change and inequality.

Political Ideology, Social Behaviour, Cooperation, Evolutionary Psychology, Experimental Research

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Chapter One:
Unpacking the Adaptive Significance of the Political Spectrum

The Roots of Political Biology and the Opportunity for Research Development

Political differences play an important role in contemporary societies; they are at the center of social cleavages, they can determine the result of an election, the direction of a social policy, the persistence of social tensions, or the onset of armed conflict. Despite their key role in human social behaviour, the processes that contribute to the formation of political differences remain poorly understood within the social sciences (Hatemi and McDermott 2011, pg. 1-13; Jost 2006; Homer-Dixon et al., 2013; Leader Maynard 2013). Most scholars adhere to the Standard Social Science Model (SSSM), which views social and political differences as exclusively the product of socialization (Tooby, and Cosmides 1992). Within the SSSM model individuals' political attitudes, behaviours, and orientation are viewed as a consequence of social and environmental experiences such as culture, education, and parental upbringing, in combination with individuals' personal interests and motivations. Biological factors, such as genetic or hereditary influences, are explicitly excluded from the SSSM for theoretical as well as historical reasons (Hatemi and McDermott 2011, pg. 1-13; Tooby, and Cosmides 1992). Problematically, many statistical models relying on the SSSM are often no better than chance at predicting individuals behaviour (Alford, Funk, and Hibbing 2008; Fowler et al., 2008; Hatemi, Eaves, McDermott 2012; Hatemi and McDermott 2011, pg. 40; Matsusaka and Palda 1999; Loewen and Dawes 2012). To researchers interested in the “ultimate” as opposed to “proximate” causes of human behaviour, such as political psychologists, the limited ability to account for individuals' attitudinal variation suggests that the SSSM must be omitting a significant cause, or causes, of political differences (Bannister 1979; Hatemi and McDermott 2011, pg. 1-13; Tooby, and Cosmides 1992).

Recently, evidence from genetics, psychology and neuroscience has challenged the assumptions of the SSSM by demonstrating that biological as well as social factors are fundamental in shaping political differences. In 2005, Alford, Funk, and Hibbing published the first paper in a political science journal, the *American Political Science Review*, to empirically examine the heritability of political attitudes associated with liberal and conservative political dimensions. Using the twin studies method from behavioural genetics, the authors find that political attitudes and orientation are strongly influenced by hereditary factors over and above variation due to the environmental factors (Alford et al., 2005).

Following the publication by Alford, Funk, and Hibbing, political scientists are paying increasing attention to how biological factors influence the expression of political attitudes, behaviour, and orientation; however, early research projects predominantly focus on quantifying the extent of hereditary influences rather than investigating and explaining why political differences are themselves heritable (Fowler et al., 2008; Hatemi et al., 2011). Specifically, research in the subfield of political biology, and the social sciences more generally, has failed to engage with the importance of our evolutionary legacy for the structure of politics and political differences (Blank and Hines 2002; Somit and Peterson 2001; Hatemi and McDermott 2011, pg. 1-8)¹

The lack of a substantive engagement with our evolutionary past is a significant oversight, as understanding more about how our adaptive history influences our contemporary behaviours may provide insight into the complexity of human socio-political relationships. In particular, an evolutionary perspective may help researchers identify

¹ While other projects have considered a number of linkages between biological variables and political behaviours, the majority of these studies are conducted outside of the political sciences. Examples include Oxley's study of links between physiology and political attitudes (Oxley et al., 2008), Marcus' work on cognitive processing and attitudes towards specific political issues (Marcus 2000; Marcus 2010). Caprara et al looks at how personality traits correlate with attitudes towards specific political issues (Caprara et al., 2006).

whether there is a discernible superstructure underlying political attitudes or orientations that contributes to the formation of political differences.

This project attempts to fill the research gaps within the field of *political biology* by exploring the adaptive significance of behavioural differences associated with liberal and conservative political orientations. This thesis investigates how behavioural dispositions with connections to human evolutionary history are contributing to the liberal and conservative dimension of the political spectrum. While there are numerous approaches to the study of political differences across the social sciences, a complete discussion of each of these approaches is outside the scope of this project (for a review of social sciences approaches to the study of political ideology and orientation see Hatemi et al., 2011; Leader Maynard 2013; Homer-Dixon et al., 2013). As a result, this thesis will principally engage with research within the sub-field of political biology.

This thesis adopts an innovative approach to the study of political differences by exploring the basis of these differences using an evolutionary framework. By applying an evolutionary framework I focus on studying the relationship between widespread behavioural characteristics and different political orientations. No consideration is given to developing a ‘thick’ descriptive account of the ‘systems’ of belief and discursive social structures contributing to political differences. Political differences are measured using simple liberal-conservative spatial representations using self-report measurement, by self-reported political party affiliation, as well as measures of socio-political attitudes. In investigating the evolutionary influences on liberal-conservative orientations I adopt a behavioural approach, which focuses on studying the behavioural differences associated with individuals who identify with these two orientations and how these differences affect their behaviour under different socio-environmental contexts, specifically behaviours

related to trust and cooperation. In undertaking this project I have two primary research questions.

First, is whether liberal and conservative individuals differ in their responses to the same kinds of environmental stimuli. Based on a synthesis of research I identify key behavioural and attitudinal differences associated with liberal and conservative political orientations. Using an experimental design I test whether exposure to conditions related to these differences produce different behavioural outcomes in liberal and conservative individuals. I focus on how conditions of social change and social inequality affect the willingness of individuals to trust and cooperate in a social interaction. Research finds that the tolerance of social change and social inequality predict political orientation across liberal-conservative and left-right ideological scales (Jost, Federico, and Napier 2009). Studies also find that both conditions of social change and social inequality can have a significant impact on the general level of social trust and cooperation, suggesting a possible mechanism to account for an evolved utility behind the sensitivity to these conditions (Anderson, Mellor, Milyo 2011; Anderson, Mellor, Milyo 2008; Sosis 2000; Sosis and Ruffle 2004; West et al., 2006). However, no studies have investigated how individuals with liberal and conservative political orientations actually respond in social situations in which these conditions are present. This approach to the study of political orientation is unique as it attempts to understand the basis of political differences by exposing individuals to material conditions reflected in their social attitudes.

Second, I investigate whether an evolutionary framework for the utility of behavioural differences is able to predict the behavioural outcomes of liberal and conservative oriented individuals in response to conditions of social change and inequality. I test whether liberal and conservative behavioural differences under conditions of social change and inequality reflect evolved strategies for social interaction, specifically two alternative strategies to maximise returns (reciprocity) from social interaction. I measure

the utility of these alternative strategies by comparing the extent to which liberals and conservatives cooperate during a social interaction under a series of different environmental conditions.

The purpose of this research is to investigate the applicability of an evolutionary framework to account for the behavioural differences associated with liberal and conservative political orientations. By examining the association between heritable traits such as attitudes and values, and individual behaviour within a social environment, I hope to understand more about how these traits benefit individuals, and consequently why these traits, or a subset of correlated behaviours, evolved in the human lineage.

As part of this thesis I argue that the study of politics and political ideology may benefit from an evolutionary framework that understands the formation of political differences is influenced by past adaptive problems for socio-environmental interaction (Peterson 2009). In other words, that the very structure of political attitudes and political values has been influenced by socio-environmental experiences from our deep historical past. In developing the argument that liberal and conservative differences are influenced by past adaptive problems I employ the concept of “environmental risk factors” from epidemiology and behavioural psychology. In the second chapter, I utilize the concept of environmental risk factors to explain for a social science audience how the natural sciences, and biology in particular, approach the study and understanding of the causes of behavioural variation as an interaction between biological and environmental factors.

Section 2: Chapter Outline

In this introductory chapter I outline the motivations and key theoretical foundations contributing to this research on the adaptive significance of liberal and conservative political differences. For researchers unfamiliar with the basic principles of evolution please refer to Section 14 on page 27.

In Section 3, to frame this project as a response to the inclusion of new research methods to the study of ideology I begin by providing a brief overview of the spectrum of ideological research being conducted across the social sciences. Because of the theoretical complexity of this research a comprehensive review of more traditional social science literature is not included as part of thesis so that more attention can be devoted to unpacking the relevant concepts. As a result, a general overview of the approaches in the social sciences is important for understanding where this thesis fits methodologically into the wider field of ideological research, as well as the applicability of the research methods adopted in this thesis for answering the research questions. Therefore, I focus on outlining the broader trends and methods rather than specific research outcomes.

In Section 4, I present a brief overview of the approaches used in political science to identify and categorize political orientation and self-placement across liberal-conservative scales. Similar to Section 3, I focus on the research trends rather than the results of specific studies.

In Section 5, I present a brief summary of the definitions and applications of causation in the natural sciences. While political scientists are likely familiar with the terminology of causation, the application and scope of causal definitions in the natural sciences are significantly different from those of the political sciences and understanding how these definitions vary is important to the view of behaviour adopted by this research.

In Section 6, I outline the broader motivations for this research project; including the need for political biology, and the social sciences generally, to develop a more comprehensive model with which to study the processes underlying the formation of political differences.

In Section 7, I introduce the sub-field of political biology to a general social science audience, and provide a brief summary of the common methods, approaches, and assumptions.

In Section 8, I review the literature from political biology concerning the causes of ideological differences.

In Section 9, I outline the problems with the existing approach in *political biology* to understanding the causes of political differences. I also introduce the primary motivation of this thesis, to investigate the effect of behavioural differences associated with liberal and conservative political orientations, and whether these differences conform to the predicted outcomes of an evolutionary framework.

In Sections 10 and 11, I outline the experimental approach to the study of liberal and conservative political differences undertaken in this thesis. I also outline the two evolutionary frameworks used to account for the potential adaptive utility of liberal and conservative political differences as well as the basic predictions I test in each of the three experiments.

In Sections 12 and 13, I outline what is meant by the term heredity and the inheritance of political attitudes and orientations.

In Sections 14 and 15, I outline several theoretical assumptions, such as the phenotypic gambit, important for placing liberal and conservative political differences within an evolutionary framework.

Section 3: Ideological Approaches in the Social Sciences

While the social sciences have generated a significant number of methods and techniques to study ideology, the process, or processes, through which ideology actually shapes political differences, such as attitudes, beliefs, values, or preferences, remain poorly understood (Hatemi and McDermott 2011, pg. 1-13; Homer-Dixon et al., 2013; Jost, Federico, and Napier 2009; Leader Maynard 2013). According to Homer-Dixon et al., this lack of a comprehensive understanding is in part driven by the splintered nature of ideological research across the social sciences, and the lack of a single unifying framework capable of reconciling the findings of the many disparate approaches (Homer-Dixon et al., 2013; Jost, Federico, and Napier 2009). In the following section I discuss how an evolutionary approach, which focuses on how the utility of a trait contributes to its expression within a population, may provide a framework capable of integrating these disparate approaches. However, before discussing the contribution of an evolutionary approach to the study of ideological differences it is important to understand how the methods utilized in this research fit into the spectrum of ideological studies. Here, I rely on the field summaries conducted by Leader Maynard (2013) and Homer-Dixon et al., (2013).

According to Leader Maynard, the various approaches to the study of ideology can be summarized into three broad categories: 1) Conceptual Approaches, which look at the “substantive content of distinct ideologies”; 2) Discursive Approaches, which look at the “expression of ideology in text, speech, and non-verbal discourse such as imagery, and symbols, and the role such discourse plays in shaping political perceptions and behaviour.”; and 3) Quantitative Approaches, which look at the “relationship between

individual traits such as political attitudes, through survey and experimental analysis”.²

The common theme to these approaches is that each offers a framework for understanding the existence and function of an ideological system. I focus on the quantitative approach to ideology, as this is the approach adopted in this thesis.

Leader Maynard describes quantitative approaches as predominantly interested in establishing correlations, or causal links between specific social-attitudinal positions and political behaviour. As a result, the quantitative school has developed a number of complex theoretical models to capture the relationship between “cognition” and political behaviour. However, as Leader Maynard points out, quantitative approaches, unlike conceptual or discursive approaches, offer little insight into the structure of ideologies; for example, why ideologies are composed of specific ideas, beliefs, values, and attitudes and not others, as well as the deeper functions of these positions for the individuals who hold them. Leader Maynard further notes that within the quantitative approach there is “a near universal assumption that ideological beliefs and attitudes can be straightforwardly identified as ‘conservative’ and ‘liberal’”, and that a simple spatial scale is all that is required to capture “all that ideology describes” (Leader Maynard 2013, pg. 13). By focusing on the relationship between traits and orientation, the quantitative approach often takes for granted the existence and structure of the ideological spectrum (Hatemi and McDermott 2011, pg. 7-9). However, the value of a quantitative approach is not its ability to explain the existence and structure of an ideology, but is its ability to establish connections between individual traits and specific outcomes, such as attitudes and behaviours, allowing for a more objective interpretation of the relationship between

² Examples of the conceptual approach include the work of Michael Freeden. Freeden’s work views political ideologies as filling a “vital and ubiquitous political need: providing the frameworks for people to understand their political worlds.” (Leader Maynard 2013, pg. 5). Examples of discursive approaches given by Leader Maynard are “critical discourse analysis” as well as the post-structuralist school and include authors Chantal Mouffe and Slavoj Žižek. Chantal Mouffe’s work for example, centers on a post-Marxist discourse. For Mouffe, “‘myths’ are highly salient stories which depict world views as being objectively true for a given social group (Leader Maynard 2013, pg. 10).

environmental factors, individual traits, and behavioural outcomes.³

In the following thesis I utilize a quantitative approach to study the causes of political differences. Using an experimental methodology I focus on the how behavioural differences linked to ideological orientation influence social interaction under different environmental settings. I also examine connections between differences in individuals' behaviour, and specific sets of political attitudes or political values. However, a key difference in the approach adopted by this thesis is the attempt to establish, through the application of an evolutionary framework, an understanding of existence and structure of the ideological spectrum, and the 'deeper function' of political attitudes or values for the individuals who hold them. While the objective of developing the underlying ideological structure of liberal and conservative ideology is similar to conceptual or discursive approaches, this thesis differs from these approaches in that it focuses on understanding this structure in terms of behavioural utility as opposed to the meaning and interpretation of actions for individuals within a social milieu.

In addition to the three categories outlined by Leader Maynard, Homer-Dixon et al., suggests the study of ideology can be divided across two further research dimensions. First, is how researchers conceptualize ideological content, for example whether researchers use a spatial or a non-spatial construct to capture ideological differences. Second, is how scholars explain ideological attachment; is someone's ideological position a function of individual attributes, or a product of normative factors such as social institutions or regulation. (Homer-Dixon et al., 2013)

According to Homer-Dixon et al., spatial approaches structure or quantify

³ Conceptual or discursive approaches must interpret the meaning and significance of ideological content for an individual in order to establish how and why this information informs an individual's worldview. This introduces an element of subjectivity not present in quantitative approaches.

ideological differences with a Cartesian coordinate system, reducing the core elements of ideology to dimensions across two or more axes. While spatial approaches are often criticized for simplicity and reductionism, they are useful for researchers interested in studying the broad characteristics that compose different ideologies. Where spatial approaches focus on dimensionality and distances between ideological positions, non-spatial approaches view ideologies not as positions on a spectrum, but as a “systems of belief” whose meaning is tied to specific socio-environmental contexts such as one’s cultural or religious identity. Non-spatial approaches tend to focus on the “combination of symbols” or “ideas” which are integrated into an ideological structure (Freedman 1998 in Homer-Dixon et al., 2013, pg. 3). For example, in his research on political ideology Paul Thagard employs a technique called Cognitive-Affective Mapping (CAM), which visually represents “the emotional values” of interconnected concepts. By tracking the varying affective statuses between differences concepts - positive, negative, neutral, or ambiguous - Thagard visually maps these concepts, creating a “field” of ideological content. (Thagard in Leader Maynard 2013, pg. 7; Thagard 2012). Given that the objective of this research to understand how broad based behavioural characteristics, such as dispositions, contribute to the structure of ideology and political differences, for example, attitudes towards welfare spending, I apply spatial approach based on attitudes towards social change and inequality to capture ideological differences between liberal and conservative orientations. The objective here is not to understand in a conceptual or “symbolic” sense, how the relationship between ideological concepts defines the structure of an ideology, but to understand why key behavioural differences associated with liberal and conservative ideological positions exist within the population prior to their interaction with socio-cultural factors.

Lastly, Homer-Dixon points out that individualistic and social accounts of ideologies loosely align with disciplinary differences. Researchers in psychology and

political science focus more on individuals' characteristics, such as psychological needs or rational self-interest. Alternatively, sociologists and researchers in the socio-cultural side of politics focus on the discursive aspect of ideology such as its relationship to power and normativity within societies. Individualistic approaches focus on establishing connections between "individual traits" such as beliefs, attitudes, or behaviours and "ideological attachments" (Homer-Dixon et al., 2013, pg. 3). Homer-Dixon notes that, more recently, individualistic approaches include investigating connections between ideology and traits at the genetic, physiological, and psychological levels of analysis. In comparison, social approaches to ideology focus on studying how social interactions themselves create, shape, define, and change social content. For social approaches, social interaction and discourse are essential components of the structure and content of ideology, and not merely vectors for ideological propagation.⁴ Consistent with an evolutionary framework, this research focuses on the individual level of analysis, identifying how variation in the traits of individuals who hold liberal or conservative political orientations may contribute to the structure of political differences.

In summary, the following thesis will employ a quantitative approach to the study of ideology. Using an individual level of analysis I focus on the connection between differences in behavioural traits, trust and cooperation, in response to social change and inequality, and a spatially informed view of political ideology based on specific attitudes associated with a liberal-conservative orientation. No attempt is made to develop a thick descriptive account of ideological differences using the techniques commonly applied to the social sciences; instead I employ an evolutionary framework that evaluates the utility

⁴ Homer-Dixon et al., point out that across the two dimensions they discuss as well as the three categories laid out by Leader Maynard there are a number of methodological subsets, data sources, research objectives, and conceptual toolkits which all contribute to the "extreme range" of approaches to the study of ideology (Homer-Dixon et al., 2013 pg.3).

of behavioural differences correlated with liberal and conservative identities for social interaction.

Section 4: Traditional Approaches to Political Differences in the Political Sciences:

In political science the study of political differences has traditionally focused on the influence of three general categories; 1) the study of social structural factors; 2) the study of party identity and affiliation; and 3) the study of individual values (Inglehart and Klingemann 1976; Freire 2006). While the study of social structural and partisan influences have traditionally dominated the study of political ideology and political behaviour, the role of individual values is becoming increasingly important for understanding the nature of political differences. Below, I briefly outline the approach to studying political differences in each of the three categories. I then discuss how recent changes to the structure and function of the political landscape are impacting these traditional approaches, making the study of political values, and their associated attitudes, increasingly important to the study of political differences. I conclude by outlining how my research on the adaptive significance of political differences will further contribute to research on the relationship between values, and attitudes, and political orientation.⁵

Social Structural Factors

Social structural factors are one of the most commonly used metrics for studying the causes of political differences, including liberal-conservative political orientation (Piuriko 2011; Freire 2006). As described by Freire, social structural factors refer to the

⁵ Methodologically, while these three categories are often treated as separate approaches researchers in political sciences recognize that there exists a significant amount of overlap and interaction between social factors, partisanship, and values and that these factors are capable of influencing one another (Glynn et al., 2015).

social “connections between citizens,” such as individual friendships or social ties, as well as the social structures and identities that facilitate these connections, for example, membership in the same church (Freire 2006, pg. 360). Social structural factors include religious affiliations, organizational groups such as trade unions, as well as socio-economic factors such as employment, income, education, and gender (Freire 2006). As a method for studying political differences, researchers studying social structural factors focus on how conditions within an individuals’ social environment as well as their life histories and social affiliations contribute to individual political positions, such as their political attitudes. For example, in the classic book “The American Voter”, Campbell et al., argue that individuals’ partisan identity is predominantly a result of familial socialization. Using longitudinal data for voting behaviour coupled with participant interviews, Campbell et al., find that most individuals do not operate on the basis of a consistent and coherent set of political positions. Instead, they find that individuals display frequent inconsistencies in their beliefs about political issues across time, and that they are often unaware of which political party holds a particular position on a given issue (Campbell et al., 1960 pg. 146-167). Based on their data, Campbell et al., argue that individuals’ partisan identity is primarily formed through exposure to their social milieu, and in particular the influence of their immediate family.

Partisanship

The study of partisanship became increasingly central to the study of political differences following the publication of the “The American Voter” by Campbell et al., in 1960 (Goren et al., 2009). The partisanship approach to studying political differences looks at the complex relationship between an individual’s loyalty to a specific political group and the influence of that group on their political attitudes, values, or issue positions.

According to Goren, political parties can influence individuals' decisions on political issues by triggering "latent partisan biases in the minds of citizens." Goren argues that, through individuals' perceived sense of loyalty and shared identity with a group, political parties can affect "the degree" to which individuals express specific attitudes or support particular issues (Goren et al., 2009, pg. 1). Studies on the effect of partisanship on orientation also consider the influence of in-group/out-group relationships on the expression of political issue positions, the extent to which political identities can reinforce partisan sentiments, or the extent to which partisanship may constrain individuals' attitudes, values, or issue positions (Goren et al., 2009). Studies of partisanship often focus on the influence of elite discourse on individual preferences for specific socio-political issues. Significantly, because the partisan approach to ideological self-placement is based on cues individuals receive from parties, groups, or political leaders, much less emphasis is given to the continuity of self-placement as compared to the value or social based approaches (Bartles 2002).

Value Factors

The final category in the study of political orientation is the study of values. According to Knutson, values "are prescriptive beliefs which set behavioural norms and may determine the attitudes and identities people should adopt towards specific objects and labels" (Knutson 1995, pg. 2).⁶ Within this approach values are viewed as

⁶ An additional approach to the study of political orientation are heuristic approaches. Strongly influenced by the "online models" of Zaller, heuristic approaches attempt to use decision-rules based on cultural values, perception, or reputation to study how individuals receive, filter, or recall information that is either consistent or contradictory to their own worldview (Gastil et al., 2011; Zaller in Druckman and Lupia 2000, pg 9; Mondak 1993; Wildavsky 1987). By relying on the social information that is most salient for individuals, researchers are able to predict political orientation with very high accuracy (Druckman and Lupia 2000). Heuristic approaches are highly related to the three predominant approaches listed above, often incorporating considerations of about individuals' socio-structural influence, partisanship, or values within their predictive models.

structuralising tools that individuals use to “organize and prioritize their beliefs and feelings regarding” socio-political issues; for example, attitudes about the appropriate structure and function of the social group (Piuriko et al., 2011 pg. 537; Smith et al., 2011). Value based approaches to the study of ideology often use individual value positions to predict orientation or self-placement across a spatial scale, or to predict individual political attitudes (Caprara et al., 2006; Piuriko et al., 2011). For example, research finds that values towards Universalism-Benevolence, and Conformity-Tradition, are strong predictors of liberal-conservative political and ideological orientations. Within Western European countries they are also strong predictors of the left-right political and ideological orientations (Piurko et al., 2011; Smith et al., 2011). For many political scientists values are extremely effective tools for capturing political orientation because, as prescriptive beliefs, values are more stable over time than social structural factors such as demographics or group affiliations. As a result, values represent a reliable measure of “generalized political positions” across an individual’s lifetime (Knutson 1995, pg.2).

Within the social sciences values are becoming increasingly important as a tool for studying politics and political differences (Caprara et al., 2006; Feldman, 2003; Puriko et al., 2011, pg. 537; Schwartz et al., 2010; Sniderman et al., 1991). While political scientists have long pointed to the importance of values as “the building blocks” of political ideology and political orientation, political science has historically focused on social structural and partisan factors as the predominant influence on individual political ideology, orientation, and voting behaviour (Caprara et al., 2006; Feldman, 1988; Piurko et al., 2011, pg. 538; Schwartz et al, 2010) However, a number of recent publications have suggested that values may be replacing social structural factors and group loyalties as the “critical determinants” of political ideology, orientation, and even voting behaviour (Caprara & Zimbardo, 2004; Caprara et al., 2006; Piurko et al., 2011, pg. 538; Schwartz et

al., 2010). According to Caprara et al., this increased emphasis on values is partially driven by a reduction in the relevance of the political parties to the political process (Caprara et al., 2006 pg. 25). Wattenberg argues that an increased emphasis on individual interests, individual candidates, and stand-alone political issues has significantly eroded the extent to which an individual's political identity is tied to a specific political party (Wattenberg 1998, pg. 2-7, 132-134). As a result of this reduction in the salience of party identity, values are becoming increasingly important as tools for political communication, such as the processing and justification of political decisions, the sharing of political ideas, and for connecting with individual voters (Caprara et al., 2006; Feldman 2003; Piurko et al., 2011 pg. 537; Wattenberg 1996). A cross-cultural comparative study by Piurko et al., demonstrated that, among liberal European countries, values predicted political orientation more strongly than socio-demographic factors.⁷ Piurko et al., also finds that in more traditional European countries where social-structures such as religious identities exert a stronger influence over social and political issues, such as in Greece, Ireland, Poland, or Spain, values were as significant as socio-demographic factors in predicting political orientation (Piurko et al., 2011).

In addition to their utility for predicting an individual's political orientation, research finds that the values underlying left-right and liberal-conservative political and ideology orientations are consistent across a range of cultural groups (Barnea 2003 in Schwartz 2010; Schwartz, 2003; Thorisdottir et al., 2007). For example, in a sample of European countries Piurko et al., find that values for Universalism and Benevolence strongly predicted left-liberal orientation while values of Conformity and Tradition strongly predicted right-conservative orientation (Piurko et al., 2011). Similarly, in a study

⁷ In countries Piurko et al., identify as "traditional", values and socio-demographic factors had similar levels of prediction. In post communist countries, where the meaning of left-right orientation takes on a slightly different interpretation due to the historical influences of communism, socio-demographic factors were stronger predictors of orientation.

of Western and Eastern European countries, Thorisdottir et al., finds that values for traditionalism and tolerance of inequality strongly predicted a right political orientation among Western European countries, and that values for traditionalism strongly predicted right orientation among Eastern European countries. Thorisdottir et al., also found that values for order and adherence to rules predicted right orientation in both Western and Eastern European countries; however this effect was stronger in Western European countries (Thorisdottir et al., 2007). In a similar study on values involving a US sample, Smith et al., find that implicit social attitudes towards equality and universalism, conformity and traditionalism, and the punishment of rule breakers, strongly predicted liberal-conservative orientation (Smith et al., 2011).⁸

The cross-cultural similarity in values between liberal-conservative and left-right political dimensions suggests that these two dimensions may be touching upon the same universal set of behavioural dispositions. In addition to being predictors of political orientation, research finds that values are highly correlated with personality traits and with political attitudes, both of which are influenced by hereditary factors suggesting a possible biological explanation for the expression of value differences within a population (Bilski and Schwartz 1994; Caprara et al., 2006; Piurko et al., 2011; Smith et al., 2011). In a recent genome study, Hatemi et al., find that values related to equality-egalitarianism, and authority-freedom are influenced by hereditary factors across cultural groups (Hatemi et al., 2014).⁹

Some caution is required when interpreting the universal character of values across the liberal-conservative and left-right political dimensions. While there is evidence of similarities between the values, attitudes, and behaviours of individuals identifying as

⁸ Implicit social attitudes are attitudes towards the appropriate structure and function of the social group (see Smith et al., 2011)

⁹ Value measures utilized in Hatemi et al., 2014 focus on values related to equality and egalitarianism, individual freedom and respect for authority, limiting insight into the extent of hereditary influence across the range of possible social values.

liberal-conservative and people who identify as left-right, this comparison does not generalize across *all* cultural boundaries. For example, Piuriko et al., find that, as a result of its historical experiences with Communism, the meaning of left-right on the political spectrum differs in Eastern European as compared to Western European states. In Eastern Europe for example being politically “right” is associated with preferences for social change and free market development, while politically left is associated with preferences for traditionalism and social stability. Evidence from genome wide studies also points to the importance of cultural or contextual factors when comparing liberal-conservative and left-right political dimensions. In their most recent genome wide analysis, Hatemi et al., find that liberal-conservative identity is consistently predicted by hereditary factors across cultural lines (Hatemi et al., 2014). However, Hatemi et al., also find that within the same sample of European countries, Denmark, Hungary, and Sweden, the meaning associated with the political left and right was dependent upon socio-cultural factors such as party identity, and was not significantly influenced by hereditary factors. Within Sweden for example, the meaning of politically left and right predominantly refers to specific political parties within the Swedish system and not to positions on the ideological spectrum (Hatemi et al., 2014 pg. 291).

While this thesis is predominantly interested the adaptive significance of liberal-conservative ideological orientations it is well placed to make important contributions to the study of political values, as well to the literature on political biology. Specifically, the two dimensions I use to study the adaptive significance of liberal-conservative political orientations, attitudes towards social change and inequality, are based on a meta-analysis of differences in socio-political values (Jost et al., 2003; Jost, Federico, and Napier 2009). As discussed further in the second chapter of this thesis, by studying how individuals with liberal-conservative political orientation respond to conditions of social change and inequality this thesis will *also* develop insights into the deeper function of the values

differences for individuals within in the population. In other words, how and why individuals develop differences in socio-political values.

Section 5: The Meaning and Significance of Causation in the Natural Sciences

Before outlining the motivations and methods of this research project it is important to establish the meaning of “causation” in the natural and biological sciences as this concept is substantively different from that of social sciences, and is central to understanding the behavioural approach adopted by this thesis. Below, I outline two treatments of causation within the natural sciences. First, are types of causal models used in the sciences. Second, are the levels of causation, or levels of analysis at which causation is applied to the study of behaviour in the biological sciences, which are referred to as Tinbergen’s Questions, or “levels of analysis” (Tinbergen 1963).

Within the natural sciences the occurrence of an event can be accounted for using three models of causation: “causal” causal explanations, functional causal explanations, and intentional causal explanations (Elster 1983; Fay and Moon 1977; Smith and Winterhalder 2009). While the term “causal” is used within the social sciences in reference to all three types of explanations, and often without differentiation, in the natural sciences “causal” explanations are exclusively the product of the physical sciences; geology, chemistry, physics. By definition, causal definitions require 1) knowledge of the physical mechanism and properties of objects involved in a process; and 2) knowledge of how these properties interact to induce the interaction. Employing a strict reductionist methodology, causal definitions seek to isolate in time and space the particular properties of the objects in an event, how these properties interact to produce and event, and why these properties lead to a specific outcome as opposed to another (Elster 1983; Smith and Winterhalder

2009). Because of the inherently complex natures of social environmental interactions, this kind of causal explanation cannot be directly applied to social phenomena.

The second type of causal model is functional explanations. Functional explanations are used by both the social and biological sciences to explain the characteristics and properties of the objects they study. Functional explanations are less concrete than causal explanations. Whereas causal explanations operate by defining outcomes according to the interaction of the characteristic properties of the objects (Fay and Moon 1979; Lakoff and Johnson 1999), functional explanations, “explain characteristics by virtue of their unintended beneficial consequences” (Smith and Winterhalder 2009 pg. 42). Functional explanations contain an element of utility not required by causal definitions and are often applied to specific actors or organisms. (Lakoff and Johnson 1999).

For example Elster (1983 pg. 57), reduces functional explanations to the following formula:

1. There exists one or more actors (A) who possess some characteristic (C)
2. (C) Produces some beneficial consequence (B) – beneficial for (A)
3. (B) Is unintended, and perhaps unrecognized, by (A)
4. (B) Maintains (C) by a causal feedback loop passing through (A)

Functional definitions, as applied to the study of behaviour, therefore account for the outcome of an event according to a “beneficial consequence” for the objects involved. Both the biological and the social sciences employ functional explanations as both are interested in understanding the behaviour of particular organisms and the role of these behaviours in that organism’s lifecycle (Smith and Winterhalder 2009).¹⁰ As pointed out by Smith and Winterhalder, this shared emphasis on actors/organisms as a unique locus of

¹⁰ In the life and evolutionary sciences (B) refers to fitness.

study is what separates the biological and social sciences from research in the physical sciences (Smith and Winterhalder 2009).

However, while both the social and biological sciences share an emphasis on actors/organisms the key difference is the theoretical foundation upon which these two disciplines justify their inferences when employing a functional explanation. A key motivation to this thesis is that the political sciences lack a formal causal theory with which to validate their functional explanations regarding the “causes” of human behaviours (Hatemi and McDermott 2011, pg. 13-27). While the biological sciences have a causal theory, the theory of evolution by natural selection, to justify why behavioural outcomes occur the social sciences lack an equivalent ontological foundation. In other words, the political sciences have no method to explain *a priori* why the behaviours they observe should be expressed and maintained within the population.¹¹

The final type of causal explanation is intentional explanations. Intentional explanations account for actions in terms of the beliefs and preferences of the actor (Elster: Chapter 3). Here, both beliefs and preferences are required to explain behaviour. Smith and Winterhalder use the example of employment. Knowing an actor’s preferences about a job as a Lawyer vs. a job as a Professor is easy to determine; however, the ability to explain why a subject prefers a particular choice requires that we know something about their beliefs and how these beliefs apply to each of these choices (Tooby and Cosmides

¹¹ While functional and causal explanations are distinct forms of justification, functional explanations remain dependent on causal explanations for internal coherence and validity (Elster 1983; Smith and Winterhalder 2009). Recall from the definition of functional explanations that (B) maintains (C) but only if (C) causes (B) to occur. Within the biological sciences (B) refers to the fitness of the trait that is caused by characteristic (C); for example, height. This means that the fitness of height (B) maintains the trait of height (C) within a population, but only because being tall (C) increases a subject’s fitness (B). The validity of functional explanations is dependent upon outside theories to justify the relationship between (B) and (C), which in this case is the theory of natural selection, which explains the utility of the trait in terms of fitness. Biology, therefore, is able to rely on functional explanations of behaviour because it has a causal theory, “the theory of evolution by natural selection,” which “licenses us to explain organic phenomena through consequences that are beneficial in terms of reproductive capacity” (Elster 1983 in Smith and Winterhalder 2009 pg. 42).

1992; Crick 1995, pg. 7-9; Hatemi and McDermott 2011, pg. 13-17; Smith and Winterhalder 2009, pg. 45).

While intentional explanations are very useful for identifying relationships between traits and behaviours, the problem is that intentional explanations are limited in their explanatory scope by virtue of the fact that the ability to explain any particular set of beliefs or preferences requires some other explanatory method; i.e. causal or functional. Put differently, while it is possible to derive some beliefs and preferences from “higher-order” preferences, it cannot be done indefinitely and at some point you will need to provide a substantive mechanism upon which a belief is actually based (Fey and Moon 1979; Tooby and Cosmides 1992). Subsequently, intentional explanations lack the structure to fully explain individuals’ actions; for example why individuals would or could hold a motivation towards a particular action in the first place. An example of an intentional explanation is the black box approach of rational choice theory, which uses observed behavioural outcomes or preferences to make predictions about individuals’ future behaviours (Green and Shapiro 1994). While rational choice theory is able to make a number of predictions about an individuals’ future actions based on their revealed preferences, the theory itself does not explain the process by which preferences come to be expressed and maintained within a population in the first place, or how individuals actually discriminate between preferences (Green and Shapiro 1994). To a biologist interested in understanding behaviour from an evolutionary or developmental perspective, intentional explanations have a limited explanatory power, as they cannot provide information about the processes underlying behavioural expression. As will be discussed in further detail, this thesis is interested in understanding more about deep historical “evolutionary” processes that lead to the development of the broad characteristic differences in behaviour that underlie political differences. In other words, how and certain kinds of attitudes, or “preferences”, come to be expressed in a population in the first place. Consequently, the

focus of this thesis is on understanding the functional characteristics of individuals' traits associated with political differences, rather than actors' motivations or beliefs themselves.

One way the biological sciences conceptualize and simplify this relationship is to approach the study of behavioural causation according to multiple levels of analysis.

Nickolaas Tinbergen argues that the causes of a given trait, or behaviour, can be expressed according to four levels of analysis; 1) Functional, 2) Evolutionary, 3) Mechanistic, and/or 4) Ontogenetic (developmental) (Tinbergen 1963).

Functional levels study the operation of a trait, and how it benefits a specific organism within a contemporary environment. This level of study involves considerations about not just how well a trait is suited to a particular environment, but whether a trait is adaptive – functional for the reproductive success of an organism over a period of multiple generations.

Evolutionary levels of causation look at how an organism and its functional traits change across time, by studying these changes across an organism's phylogenetic history. This level also includes studying how natural selection works on functional traits across successive generations to produce adaptations. Within the natural sciences functional and evolutionary levels of causation are referred to as “ultimate” levels of causation as these two levels focus on the process that contributes to the development of an organism and its traits.

The mechanistic level looks at the specific systems or process that contribute to expression of a trait. This level might involve the study of specific brain areas, neurochemicals, or other physiological systems or processes. The study of behaviour and of behavioural processes and expressions, such as dispositions, fall into the mechanistic level of analysis. While this thesis is interested in the connection between political differences and the “ultimate” causes of behaviour, the experimental work conducted in this thesis is at the mechanistic level of analysis.

Lastly, the ontogenetic level of analysis focuses on how the development of an organism contributes to trait expression. The study of causation at the ontogenetic level may involve studying interactions between genes and the environment (epigenetics), thigmotropisms, or developmental learning such as speech acquisition. Within the natural sciences, mechanistic and ontogenetic levels are referred to as “proximate” causes. Proximate causes explain the function of a trait in terms of physiological or environmental factors that act upon an organism within the adjoining and contemporary environment.

The empirical approach adopted by this thesis is to identify and study the proximate causes – behavioural differences – which contribute to differences in political orientation. As such, the primary focus of the experiments conducted in this thesis is on the mechanistic level of causation. The secondary goal of this thesis is to evaluate how these proximate causes may be a product of deeper “ultimate” causal processes and specifically functional characteristics. Here, I consider how the behavioural outcomes of each experiment conform to the predicted outcomes of an evolutionary framework capable of explaining the potential utilities of these behaviours for survival and reproduction over successive generations. Each of these frameworks, the Social Risk and Group Reciprocity hypotheses, are grounded in the literature on the evolution of cooperation and employ established proxies for utility maximizing behaviours as part of their predictive frameworks. Based on how the observed experimental outcomes conform to these evolutionary frameworks I evaluate how these behavioural outcomes associated with liberal and conservative orientations may contribute to individuals’ fitness on a functional level of analysis, such as adaptive strategies to obtain returns from social interaction.

Importantly, while the evolutionary frameworks utilized in this thesis are, in conjunction with the heritability of political differences, sufficient to establish a compelling theoretical justification for the adaptive significance of the traits associated

with different political orientations, this justification is not sufficient to fully explain the evolution of these traits. Missing from the equation is a mechanism that demonstrates that these two alternative strategies can be stable within a population over multiple generations. In Chapter 2 of this thesis I outline the evolutionary mechanism (frequency dependence) best suited to account for why liberal and conservative political differences may exist as stable strategies for social interaction and how this mechanism may account for the experimental results obtained in this thesis.

Section 6: Motivation of Research: Research Utility of a Biological Perspective

My research utilizes principles from the natural sciences and psychology to bring new insights to the deep causal processes that contribute to the expression of political differences, and in particular differences in political attitudes associated with liberal and conservative ideological orientation. The initial motivation for this project is that traditional political science approaches to studying political differences are no longer sufficient to provide a comprehensive causal explanation of the formation of political attitudes and orientations (Alford, Funk, and Hibbing 2008; Hatemi et al., 2010; Hatemi et al., 2011). In light of empirical evidence that political attitudes and orientation are influenced by hereditary factors, understanding the basis of political differences also requires consideration of biological influences (to whatever extent—large or small—they may contribute in additional explanatory power). By arguing for the integration of biological principles the objective is not to reduce the causes of political attitudes and orientation to a set of deterministic biological factors, but rather to assist in the development of a more rigorous behavioural model (Alford, Funk, and Hibbing 2008; Hatemi and McDermott 2011, pg. 19-40; Smith et al., 2011). Of particular importance is the need for researchers to adopt a view of behavioural and political differences that is

capable of understanding causation across multiple levels of analysis, as a product of Functional, Evolutionary, Mechanistic, and Developmental processes (Tinbergen 1963). As part of the process of generating this new behavioural model researchers in the political sciences must give newfound attention to questions about; 1) the causes of political differences, 2) the purpose of these differences for individuals in both the immediate and historical environments, and 3) the variation of these differences between individuals within a population (Hibbing et al., 2013). An important feature missing from the behavioural models in the political sciences, including the existing models in political biology, is the ability to account for similarities and differences in political attitudes and orientation, as these structural characteristics may provide important clues for understanding the deeper processes underlying political differences (Hibbing et al., 2013).

As a fundamental theory to explain behavioural variation, evolution by natural selection is ideally situated to assist the political sciences in transitioning to a more complex view of behaviour and behavioural causation (Tooby and Cosmides 1990; Tooby, and Cosimdes 1992). Employing the principles of Darwinian fitness and utility, as measured by survival and reproduction, evolution can provide both meaningful and testable hypotheses to explain the existence of specific political attitudes, and their associated behavioural traits within a population across multiple levels of analysis (Hatemi and McDermott 2011, pg. 19-40). As a theory driven by the interaction between organisms and their environment, evolutionary theories of behaviour are also capable of incorporating the majority of the methods and assumptions presently employed within the political sciences, including cultural theory and rational actor models, while grounding these methods within a *true* causal framework. As a theory of behaviour, evolution should not be viewed as an alternative or competitive model to the theories of the political sciences, but as an important theoretical addition to the causal foundations of political science research.

Moreover, as a causal theory, evolutionary principles about fitness and utility can be used to falsify macro level assumptions about the causal mechanisms contributing to individual behaviours, resulting in more robust empirical model (Hatemi et al., 2011; Smith and Winterhalder 2009; Tooby and Cosmides 1992).

Section 7: What is Political Biology?

Political Biology is a sub-field in political science that applies the ideas, theories, and methods of the natural sciences to the study of social and political behaviours (Alford, Funk, and Hibbing 2008).¹² An emerging research area within the social sciences, Political Biology should not to be confused with the practice of Social Darwinism, which is an attempt to apply “Darwinian” maxims, such as survival of the fittest, to the structure and function of society (Bannister 1979). As social theorists, Social Darwinists’ attempt to justify, or improve upon, many features of the social environment including poverty and exploitation through the biased application of evolutionary principles; an approach universally discredited by biologists themselves. By comparison, Political Biology is an attempt to understand the causes of social behaviour, or the features of the socio-political environment, through the application of the principles and methods developed by the sciences; predominantly in the disciplines of biology, genetics, physiology, psychology, and neuroscience (Hibbing et al., 2013, pg. 33-56). As a research field Political Biology

¹²Political Biology is not to be confused with the practice of Social Darwinism. Social Darwinism is the attempt to apply various “Darwinian” maxims, such as natural selection and survival of the fittest, to human social and political behaviours. Political Biology is the attempt to understand the causes of social behaviour, or features of the social environment according to the principles or techniques belonging to the natural sciences; biology, genetics, physiology, and neuroscience. Social Darwinism therefore, more closely aligns with a political ideology in that it postulates an ideal of “how things should be” within society, while Political Biology is strictly an attempt to understand the causes of social phenomenon according to a set of established and empirically validated methods. It makes no assertions about how society should be structured. Political Biology and Social Darwinism are therefore not synonymous (Hibbing et al., 2013, pg. 13; Bannister 1979).

makes no attempt to justify or improve upon social conditions but rather is explicitly concerned with the causal understanding of human socio-political behaviour.

While calls for the integration of biological principles to the social sciences began in the 1980's (Simon 1985), it was not until 2005 and the publication of Alford, Funk, and Hibbing's first paper on the heritability of political attitudes that the prospect of biology being influential to political behaviour was seriously considered in mainstream political science (Alford et al., 2005). As a sub-field within the political sciences, Political Biology lacks a common research framework and methodology, but rather brings a range of scientific approaches and methods to bear on a given problem.¹³ This lack of formalization reflects the diversity of Political Biology research, which includes studies from the linkages between disgust and political behaviour, to how institutions adapt over time, to overconfidence and war (Inbar et al., 2009; Johnson 2009; Viola 2007).

In conclusion, as a sub-discipline in political science, Political Biology is predominantly interested in researching the biological processes that causally contribute to human social and political behaviours. As a subfield in political science it does not attempt

¹³ As an emerging field within the political sciences, Political Biology research is unified in accepting that biological and evolutionary principles are applicable to human social and political behaviour (Alford and Hibbing 2004). More formally, the central premise of political biology is that the expression of social and political behaviours does not occur independently of biological influence, but directly involves a significant and non-deterministic causal relationship with a substrate of biological processes. The term "substrate of biological processes" encapsulates an important behavioural understanding within the natural sciences and psychology, that the cause of behavioural events can be studied and understood according to several levels of analysis. These levels, also called Tinbergen's levels are; 1) Function, 2) Evolutionary, 3) Mechanistic, and 4) Developmental levels of analysis (Tinbergen 1963). The breadth of the term is meant to encapsulate the fact that causes of a behavioural trait may depend on, or be determined by, interactions across several levels of analysis (including with other people, and with one's social and physical environment). While all behavioural expressions do ultimately involve a degree of genetic influence (since it is genes that generate bodies and brains), this relationship between heritability and behaviour is not necessarily deterministic. For example, the physiological system responsible for learning behaviour such as speech acquisition is heritable, while the language an individual ultimately learns, such as English or Russian, is not heritable.

The term "significant and non-deterministic causal relationship" captures the causal understanding of the complexity of social behaviours within the natural sciences and psychology. Here, the influence of biology on behaviour should be understood as a probabilistic, and not a deterministic, relationship in which environmental factors are capable of influencing both the expression of behaviour, and the physiological system underlying the behaviour's expression. For example, individuals may inherit differences in their learning behaviour, such as greater sensitivities to auditory as opposed to visual learning. Over the course of an individual's life necessary exposure to visual learning tasks may improve their ability to engage in visual learning and this change in sensitivity is reflected in physiological changes within the individual.

to reduce social and political behaviours to specific genetic causes—as I have stated, the goal of genetic studies is to add value by explaining additional variation in behaviour over and above the variation that is explained by social/environmental factors—but is an attempt to develop a comprehensive understanding of the processes that underlie political differences (Hibbing et al., 2013). Where there are identifiable biological relationships, Political Biology may look for, or assume, a heritable or genetic component, but this is not an indicator of reductionism or determinism as such interpretations are *fundamentally contrary* to present understandings of behaviour within the natural sciences and psychology (Flint 2010; Geary 2005; Noe 2009; Pinker 2009).

Section 8: Review of the Relevant Literature in Political Biology

The publication of the first study in political science to examine the heritability of political behaviours by Alford, Funk, and Hibbing in 2005 was a turning point in the field of Political Biology (Alford et al., 2005). Utilizing a Classic Twin Design model (CTD) the authors analysed a data sample of 55,000 participants from the Virginian and Australian Twin Studies Registries. The authors reported that between 43-53% of the variation in an individual's political attitudes is attributable to heritable factors, including individuals' political orientations. The CTD model uses the fixed ratio of genetic material between Dizygotic and Monozygotic twins as a point of reference to determine the amount of behavioural variation that is the result of hereditary (genetic) influences (Alford et al., 2005; Alford, Funk, and Hibbing 2008). The results of twin studies provide definitive evidence about the heritability of a trait. Since this initial publication, researchers have investigated the influence of a number of additional genetic and physiological mechanisms of political attitudes, and the core finding has generally been confirmed.

Hatemi et al., (2008) used a modified longitudinal twin study, which included non-twin extended family members to measure the contribution of genes and environment to political behaviours at various life stages. The authors find that genetic influences on political attitudes do not become apparent (fully expressed) until adulthood, at which point genetic factors become significant contributors - accounting for 30-70% of attitude variation. The authors also find significant differences in the effects of heredity between men and women (sex-linked hereditary differences commonly occur across all species and are important indicators of adaptive behavioural traits within species).¹⁴

Fowler and Dawes (2013) examine the effect of two gene variations upon actual voting behaviour. The authors examine polymorphisms in the MAOA and 5HTT genes, both of which are involved in transcribing neurotransmitters within the serotonin system, an area of the brain associated with fear, trust, and social interaction (Bertolino et al., 2005; Hariri et al., 2002). The authors find that among people with the “high”-activity MAOA gene the odds of a subject voting were 1.26 times greater than for a “low” gene subject. No statistical relationship was found for the 5HTT polymorphisms and voter turnout. However, a relationship was observed between voting, regular religious attendance, and the “long” 5HTT gene. The odds of voting for regular religious attendees who possessed the “long” gene were 1.58 times greater than that of subjects who possessed the “short” allele. As will be discussed in Chapter 2, this interaction between genetic variations and environmental factors is important to the understanding of behaviour and behavioural strategies developed in this thesis.

McDermott et al., (2008) examine the link between punishment behaviours in experimental games and the MAOA gene, suggesting a link between “low-activity”

¹⁴ Additional studies have examined the heritability of altruistic behaviour, egalitarian behaviour, ideology, participation, and party identification. With the exception of party identification, heritable factors proved to be significant in each of these cases; Cesarini et al., 2008; Fowler et al., 2008; Fowler and Dawes 2008; Hatemi et al., 2008; Loewen and Dawes 2012.

MAOA subjects and punishing behaviour. The study suggests the existence of an interaction effect, as MAOA-L (low-activity MAOA) individuals display a greater likelihood to punish others at a personal cost. However, this behaviour was limited to high provocation scenarios in which individuals experienced a strong monetary loss. Accordingly, McDermott et al., concluded that low MAOA individuals are disposed to engage in punishing behaviour, but that this behaviour is mitigated by social and environmental circumstances.

Hatemi et al., (2011) examine the heritable differences between liberal and conservative political orientations. Using a comparison of genetic variation across the entire genomes of multiple individuals, called a genome wide association study (GWAS), they find evidence that liberal-conservative political differences are related to differences in a number of genes coding for neuropeptide receptors including N-methyl-D-aspartate (NMDA). NMDA is a glutamate receptor and is important for synaptic plasticity, social learning, and memory - all of which are functions linked to social-environmental experience.

Oxley et al., (2008) examined the automated quality to many political attitudes. Using a measure of skin conductance, the authors found that individuals with lower physiological responses to sudden noises and threatening images were more likely to support foreign aid, liberal immigration politics, and pacifism. Individuals with higher responses were more likely to favour defence spending, capital punishment, patriotism, and the Iraq war. The authors believe these variations result from differences in the patterns of neural activity, particularly within the amygdala, an area strongly associated with fear response. Independent studies link variations in amygdala volume to hereditary factors (Oxley et al., 2008).

Alford et al., (2011) examined the correlation between mate choice and political preferences. They find that, contrary to the random distribution expected within a breeding

population, subjects preferred partners of similar political orientations and similar belief intensity. The authors evaluated mate choice according to a liberal-conservative political dimension using a 28-point item of the Wilson-Patterson Index. Alford et al., also measure political orientation using a 5-point scale. Non-random mating is an important vector for evolutionary selection as it promotes selection of variations of heritable traits within a population. The fact that individuals were selecting their romantic partners on the basis of political differences supports the conclusion that these differences are socially salient for individuals and may influence individuals' willingness to engage in a social interaction – as well as preserving the high heritability and positive selection on political differences.

While these studies provide significant insights into a number of possible genetic mechanisms to account for variation in social and political behaviour, each approach has its benefits and limitations (Flint et al., 2010). While the CTD and GWAS approaches are useful for substantiating hereditary influence on political behaviour, and isolating specific genes for more targeted research, neither the CTD nor GWAS approaches are able to capture the behavioural utility of an expressed trait. As will be discussed below, this inability reflects that fact that the expression of a trait (phenotype) depends on more than just an organism's genetic makeup (genotype) (Flint et al., 2010; Shultziner 2013). Given this fact, understanding the nature of an expressed behaviour requires a framework capable of understanding the utility, or adaptive significance, supporting a behaviour's development.

Despite a growing interest among political scientists to understand the contribution of biological factors to politics, few attempts have been made to directly apply evolutionary principles to understand the causes of political differences (Blank and Hines 2002; Hatemi and McDermott 2011, pg. 1-7). In particular, no direct attempts have been made to develop an integrated and comprehensive causal framework to explain the energies underlying political differences. While other disciplines within the social

sciences, such as anthropology, have utilized evolutionary theory to understand human behavioural traits for several decades, political scientists, including political biologists, have been reluctant to adopt these theoretical tools. As researchers like Peter Hatemi and Rose McDermott have argued, this reluctance is likely related to existing assumptions regarding the development of political differences (Hatemi and McDermott 2011, pg. 1-7). Regardless, the application of research from the natural sciences to the political sciences presents significant opportunities to expand the empirical foundations of political science research, and to gain greater insights into the causes of political differences.

Section 9: Filling the Gaps of Political Biology

As noted above, while research into the area of political biology is becoming increasingly popular within the political sciences, most projects focus on quantifying the extent to which hereditary factors shape the expression of political attitudes, or the degree to which physiological responses can predict individuals' attitudes or orientation. While studies of hereditary and physiological processes are an important dimension of political biology research, the focus of political biologists on heritable and physiological processes ignores the opportunities presented by evolutionary theory to develop a more comprehensive framework to understand the existence of political differences (Haidt 2012; Jost et al., 2003; Jost, Federico, and Napier 2009). In particular, to address questions such as why do different attitudes exist; whether there are specific behavioural advantages, or utilities, associated with certain attitudes or their related dispositions and behaviours; or whether differences in political attitudes are reflective of other important behavioural differences? For example, research finds that attitudes supporting military spending and intervention are influenced by heredity (Alford et al., 2005; Alford, Funk, and Hibbing

2008; Hatemi et al., 2010). Research also finds that having these attitudes is associated with a greater sensitivity to threatening imagery, and that this sensitivity is a strong predictor of right-conservative political orientation (Oxley et al., 2008). Based on these connections, researchers suggest that having certain political attitudes may reflect a greater sensitivity to threats facing individuals or the social group; however, no follow-up studies have been conducted to observe how the sensitivity to threatening imagery actually affects individual behaviour and decision-making under threatening environmental conditions, and whether these sensitivities are driven by individual or group level concerns. This example underlies the importance of considering the levels of analysis when thinking about the nature or causes of an individual trait.

While the connection between military support and sensitivity to group threat is a compelling explanation for the cause of this particular attitude, the claim itself provides little insight into the “function” or utility behind these attitudes; are these attitudes associated with important real-world behavioural differences which benefit the individual in question? Part of the problem is that the sensitivity to group threat can have a number of implications for individual behaviour, which are not apparent in this definition. For example, when considering a sensitivity to an out-group threat, who counts as belonging to an out-group, do some cues promote out-group behaviours more than others, are subjects more aggressive towards out-group members or are they more xenophobic, are subjects with greater sensitivities more likely to initiate conflict with out-groups, does this aggression depend on specific provocations or is it a general behaviour, are some out-group cues more salient than others, or do certain environmental factors catalyse conflict or out-group sensitivities (Johnson 2004; Keely 1996). As will be discussed further in a section 13-14, from an evolutionary perspective, when talking about the causal justification for the inheritance of a trait, understanding how a trait benefits an individual

actor is an important theoretical question. Subsequently, research in Political Biology must give greater attention to the relationship between 1) political attitudes and orientations, 2) heritability of physiological traits, and 3) behavioural differences.

In light of the established hereditary influences to political attitudes and orientations, one approach to understanding the complex processes contributing to formation of these traits is to study the behavioural differences and dispositions associated with these traits and how they affect behaviour under different environmental contexts (Sell, Tooby, and Cosmides 2009; Sell et al., 2009; Smith and Winterhalder 2009, pg. 33).

Section 10: Approach to Research: Experiments and Predicted Outcomes

This thesis applies evolutionary principles to the study of political orientation as a method to obtain a further insight into the causes of liberal and conservative political differences. Using an experimental methodology I compare and contrast the behaviours of individuals with liberal and conservative political orientations and evaluate how these behaviours may contribute to individual utility. I focus on a social context and investigate whether the behaviours associated with liberal-conservative orientation reflect alternative adaptive behavioural strategies to maximize returns (reciprocity) from social interactions. While there are no objective criteria with which to evaluate whether behaviours reflect different strategies, the concept of a behavioural strategy is meant to encapsulate the specific utilities that individuals with different political attitudes are attempting to maximize in response to specific environmental stimuli (Axelrod 1984; Axelrod 1987; Smith and Winterhalder 2009, pg. 26). The concept of a behavioural strategy will be developed further in Chapter 2, along with the concept of behaviour utilized in this research.

To evaluate the evolutionary influences contributing to liberal and conservative political orientations I employ two predictive frameworks, The Group Reciprocity and Social Risk hypotheses, which account for the utility of the behavioural differences in evolutionary terms. Both evolutionary frameworks rely on the theories of reciprocal altruism and indirect reciprocity, which account for the utility of behavioural outcomes in terms of their ability to maximize returns from social interaction over multiple iterations. According to the Group Reciprocity Hypothesis (GRH), liberal and conservative political differences reflect alternative strategies to maximize returns from social interaction by increasing the absolute level of reciprocity between individuals. The term absolute level of reciprocity refers to the extent to which individuals reciprocate fairly with the partners – ranging from altruistic to unfair reciprocation – as well as the frequency with which individuals engage in social interactions with other individuals or the social group (communal goods). Within the GRH the strategy of liberal individuals is to increase levels of reciprocity by opposing obstacles to social interaction such as inequality and social hierarchy, which cause individuals to withhold their full cooperation and reciprocation from other group members. By signaling their opposition to inequality and social hierarchy this strategy attempts to directly communicate their trustworthiness to social partners. By being less concerned with reputation and shared identity, liberal individuals may open themselves to a larger number of potential social partners; however, in doing so may incur a greater risk of exploitation. According to the GRH liberal individuals should be strongly sensitive to conditions of inequality and social hierarchy. In comparison, the strategy of conservative individuals is to foster greater levels of cooperation and reciprocation from social interactions through the application of social norms and a strong sense of social identity. Furthermore, by conforming to existing norms and structures individuals use their reputation and shared identity to advertise their trustworthiness to potential social partners as well as to point out potentially untrustworthy actors. According to the GRH

conservative individuals should be strongly sensitive to attitudes and conditions reflecting normatively stable and well-structured social environments.

In comparison to the GRH, the Social Risk Hypothesis (SRH) postulates that the sensitivity of liberal individuals does not reflect a strategy to increase the absolute level (degree and frequency) of reciprocity between individuals, but an increased aversion to social risk and a strong desire for social fairness following interactions. According to the SRH liberal individuals should be initially reluctant to engage in social behaviour, but should be strongly sensitive to social cues indicating a social partner's trustworthiness or desire to reciprocate fairly. Furthermore, the SRH postulates that the sensitivity of conservative individuals to conditions of social change is also not a strategy to increase the absolute level of reciprocity, but reflects a greater sensitivity to the negative stimuli from the surrounding environment. According to the SRH conservative individuals should initially display higher levels of trust and cooperation as compared to liberal individuals, but that these levels of interaction will decrease significantly following a negative social cue.

To test the assumptions of the GRH and SRH I conduct three experimental interactions involving participants who identify as having liberal and conservative orientations. A brief account of each experiment and its objective is provided below, and a more detailed account of the experimental predictions is provided in Chapter 2.

In experiment one, I focus on how individuals identifying with a liberal and conservative orientation respond to information about a potential cooperative partner's attitudes towards social change and inequality. Previous research finds that attitudes towards social change and for inequality and social hierarchy are strong predictors of liberal and conservative political orientation (Jost, Federico, and Napier 2009). Research also finds that many political attitudes associated with the tolerance and intolerance of

social change and for inequality and social hierarchy, such as attitudes towards the propriety of gay marriage and spending on public welfare, are heritable, which suggests that these attitudes may be linked to some form of social utility. The objective of this experiment is twofold; 1) to observe whether attitudes towards social change and inequality reflect strategies to maximize returns from social interaction by increasing the absolute level of reciprocity between individuals, and 2) to observe if implicit social attitudes (the foundations of other political attitudes) related to social change and inequality act as social cues to increase a sense of trust and cooperation between individuals. In testing of these outcomes, this experiment compares and contrasts the predictive power of the GRH and SRH to account for the adaptive significance of behavioural differences associated with liberal and conservative political orientations.

In the second experiment, I directly manipulate conditions of inequality within a social group and observe the effects on the willingness of participants to cooperate in a communal goods game. The objective of this experiment is to gain further insight into the adaptive utility of behaviours associated with liberal political attitudes and orientation. Specifically, to determine whether liberal identities are based on a strategy which attempts to increase the absolute level of reciprocity by opposing obstacles to group trust and cooperation, or a risk-avoidant strategy that seeks to avoid the costs of exploitation and ensure fair returns from social interaction (Anderson, Mellor, Milyo 2008; Schreiber et al., 2013). Within this experiment, if the GRH is correct then liberal individuals should display decreased levels of cooperation in treatments in which there are general levels of inequality between players. Alternatively, if the SRH is correct, then cooperation in liberal individuals should not be affected by the presence of general inequality, but will be affected by a violation of social fairness.

In the third experiment I directly manipulate the social environment during a communal goods game to induce conditions of social change and instability. In doing so, I

observe the effects of a normatively discordant social environment on the willingness of individuals to trust and cooperate. The objective of this experiment is to obtain further insight into the adaptive utility of behaviours associated with conservative political attitudes and orientation (Murray, Schaller, Suedfeld 2013). Specifically, to determine whether conservative identities reflect a strategy which attempts to increase the absolute level of reciprocity through the application of social norms, identity, and reputation, or a strategy that reflects a general, or greater, sensitivity to negative stimuli with the surrounding.

Within this experiment, if the GRH is correct then conservative individuals will show higher levels of cooperation in treatments where individuals share perspectives about a normative action. Alternatively if the SRH is correct, then the cooperation levels of conservative individuals will not be positively affected by shared normative perspectives, but will be negatively affected by the unshared normative perspectives (Kanai et al., 2011; Smith et al., 2011; Schreiber et al., 2013).

Section 11: Further Experimental Assumptions

The ability to draw plausible conclusions about how evolution influences the expression of ideological differences depends strongly on the relationship between political attitudes, orientation, and heredity. Based on the principles associated with the phenotypic gambit (see Section 12), because the evolution of a trait is connected to its utility – defined as the contribution it makes to an organism’s reproductive success - given a trait with a known heritability, it is possible to obtain insights into a trait’s utility by observing how this trait affects behaviour within an environment (Cosmides and Tooby 1990; Smith and Winterhalder 2009, pg. 33). Subsequently, by experimentally

manipulating environmental conditions interacting with heritable traits such as political attitudes and orientation, and measuring how an organism's behaviour changes or benefits in response to different conditions, it is possible to gain insights into the trait's utility, and therefore to understand something about why this trait evolved.

As previously discussed, based on the established hereditary influences on political attitudes and orientation, this project attempts to understand the basis of these traits within an evolutionary framework by examining their potential contribution to individual utility in the context of a social environment. This approach assumes that some aspect of the attitudes and orientation is, or has previously been adaptive. What is presently unknown is whether behavioural characteristics associated with liberal and conservative political orientation elicit effects on individual utility within a cooperative social environment.

The second experimental assumption is that the behavioural differences observed in the experimental sessions should contain utility specific for social interaction. Discussed further in Chapter Two, this assumption is based on an extensive analysis of the existing behaviours, attitudes, and dispositions associated with individuals identifying with liberal and conservative orientations, and how these dispositions are shown to influence behaviour in social contexts. Additionally, given that political differences also reflect social differences, or differences in opinion on social issues, understanding whether political differences evolved for specific social utilities is an important theoretical question. As noted, this is a presently untested experimental assumption.

An important caveat is that, while I assume for the purpose of experimentation that the traits tested are presently adaptive for social behaviour, I recognize that the evolution of these traits may be a product of adaptation to previous environmental problems. In the evolutionary sciences, cases where previously adaptive traits are influencing behaviour to produce "unintended" or detrimental behavioural outcomes is called "mismatch". The possibility that the traits under study are a product of mismatch will be discussed in

Chapter 6 during the interpretation of the overall experimental results. It is worth noting however, that the potential for mismatch has been considered in advance of the experimental sessions, particularly with respect to the Social Risk Hypothesis. As discussed briefly in Chapter 2, the differences in physiological processes, which inform the SRH, may reflect adaptations for general environmental engagement, which have subsequently been repurposed by social behaviours. This process is known as preadaptation.

A second limitation with the theoretical approach adopted in this research concerns the heritability of traits. Within the evolutionary sciences the heritability of a trait does not necessarily guarantee that the trait itself is adaptive - having evolved through natural selection on the basis of its benefits for survival and reproduction - as the heritability of the trait may be dependent on its close association to some other trait whose heritability is the product of selection. To illustrate this point Tooby and Cosmides use the example of bones. Bones have the characteristic colour of white, a trait that is universally expressed and is highly heritable (Tooby and Cosmides 1990 pg. 24). However, while the colour of bone is a heritable, bone was not selected for on the basis of its colour, but on the basis of its strength and durability. Instead of being an adaptive characteristic the fact that bones are white is simply a byproduct of selection on the materials (minerals) that compose bone and give it strength and durability. In the biological sciences these sorts of occurrences are referred to as “concomitants of adaptations” or “spandrels”, indirectly heritable traits which have been passed on through selection because of their direct association with other adaptive characteristics (Tooby and Cosmides 1990).

The recognition that traits can be heritable, but not necessarily adaptive, is important as the approach in this thesis is based on the idea that some characteristic traits associated with heritable social attitudes and values are: 1) the product of selective pressure, and are therefore adaptive; and 2) specifically adaptive for social interaction.

Again, this constitutes an important assumption within the research project, but one which is justified according to the following two principles: 1) in making this assumption I rely on the framework of the phenotypic gambit (see Section 13) which, in light of the heritability of a trait, puts questions of exact heritable mechanism aside to focus on studying the potential adaptive function of a trait; and 2) that we cannot determine whether a trait, such as differences in social attitudes, is adaptive without making some assumptions about its adaptive function and then testing these assumptions empirically. In the absence of detailed information about the function of a trait, understanding the function of behavioural differences associated with ideological orientation, as either adaptive traits or as concomitants of selection, requires that we test how individuals with observable differences behave under a variety conditions. Investigating the adaptive utility of a trait therefore requires a tradeoff between theoretical justification and empirical validation in which researchers put aside questions about what is completely theoretically justified in order to obtain baseline level of information to be used to develop more accurate theoretical models of behaviour.

In Chapter 6th of this thesis I return to the discussion about the adaptive utility of the behavioural traits associated with liberal and conservative ideological orientations in light of the experimental results presented in this thesis and present a further argument to justify the continued investigation of these differences in terms of adaptive strategies for social interaction.

Section 12: Understanding the Inheritance of Political Differences

Heritability is an important concept for explaining the transmission of adaptive characteristics across generations. While the properties and function of heritability is clearly understood within the natural sciences, the application of heritability within this

research requires clarification. A frequent question raised in discussion about the inclusion of heritable biological factors in the study of social behaviours is how researchers can separate biological and environmental influences on behaviour. While the answer is that researchers cannot separate these influences, the question itself misunderstands the nature of behaviour and behavioural expression in human organisms. Present knowledge and research methods for studying gene expression do not allow us to distinguish the effects of environmental factors in most kinds of phenotypic expression. This inability follows from the complex nature of physiological behaviour. While genetic differences can influence trait expression by affecting the production of proteins in the body, environmental factors also continuously influence gene expression (how genes make proteins) over the course of an organism's lifetime (and especially in its development). This interaction effect cannot be separated using the conventional techniques in behavioural genetics (Flint et al., 2010; Shultziner 2013). In other words, attempts to dichotomize the genetic and environmental influences of behaviour fundamentally misunderstand the causal (ontogenetic) relationship between genes, environment, and trait expression (Noe 2009).

As a consequence, twin studies and other methods for establishing the inheritance of traits such as political attitudes, do not separate the extent to which genes and the environment *interact*. Instead, these studies used a fixed level of genetic relatedness to measure the extent to which genetic factors account for the overall variation of a trait within a population; such as 30% (which may be manifested as a main effect, or as a contribution to an interaction effect). Importantly, this figure does not indicate how much of a trait you directly inherit, for example 30% of your height, but how much of the total variation in height, within the population, is accounted for by genetic differences. The validity of the methods used in behavioural genetics is extremely robust, and subject to repeated cross-validation. The gene studies on political attitudes have also been subjected to repeated testing and validation. While a number of problems exist with social scientists'

early interpretations of the results of the genetic studies, particularly with the ability to separate genetic and environmental factors (Alford et al., 2005), the heritability of political attitudes is not in question; social and political attitudes do contain an important genetic influence (Flint et al., 2010; Shultziner 2013).

Section 13: Understanding the Phenotypic Gambit

To compensate for the inability to separate the interaction between genes and environment, when studying a trait with established heredity, the biological and ecological sciences treat this trait as an adaptation and avoid detailed assumptions about the extent of the trait's heredity. This assumption is called the phenotypic gambit (Grafen 1984). The phenotypic gambit works by hypothesizing that, in the function of a trait, some "underlying strategies or decision rules" have been shaped by the process of selection, resulting in a trait whose expressed function is adaptive. (Smith and Winterhalder 2009, pg. 33). This approach to studying adaptation assumes that it is "neither necessary nor feasible to demonstrate the exact heritable basis of every trait"; instead researchers continue as though the precise heritability and phenotype (whether it is caused by a single or by several genes), is unimportant (Smith and Winterhalder 2009, pg. 33). Noteworthy is that this "gambit" is based on two further assumptions; 1) that selection will favour traits with high fitness regardless of the "particulars of their inheritance", and 2) that the proxies employed to measure traits' adaptive significance (for example, time per calories earned) strongly correlate to individual fitness (Grafen 1984; Smith and Winterhalder 2009, pg. 33). This thesis applies the assumptions of the phenotypic gambit in two ways. First, it assumes that social interactions involving trusting and cooperative behaviours and individual rewards are sufficiently beneficial to individuals that they can be treated as

proxies for individual fitness. Second, based on the heritability of the attitudes associated with liberal and conservative orientations, it is assumed that these attitudes or some correlated behaviours or dispositions are the product of natural selection, and therefore have evolved to fulfill some kind of adaptive function.

Based on these assumptions, this research makes no attempt to disentangle the relationship between genetic and environmental factors of behaviour. Both are understood to be important in interaction with each other (Flint et al., 2010). Instead, it proceeds according to the assumptions of the phenotypic gambit; that some underlying aspect of the traits being studied is the result of adaptive selection. This research assumes that political attitudes, orientation, or the associated behavioural dispositions convey some adaptive benefit for survival and reproduction. The goal of this research is therefore not to prove that liberal and conservative political attitudes and orientation are influenced by evolution, but to investigate the plausibility of hypotheses for evolutionary benefits associated with liberal and conservative political differences. By examining how heritable attitudes affect behaviour within a social environment I hope to understand more about how these attitudes benefit individuals, and consequently why these attitudes, or a subset of correlated behaviours, evolved in the human lineage.

Section 14: Brief Introduction to Basic Evolutionary Principles

Traditionally, attempts to integrate research from the natural sciences into the political sciences have been poorly received by political scientists on the grounds that such principles would result in the unwelcome condition of behavioural determinism, or on the methodological objection that socio-political attitudes and behaviours are exclusively the result of environmental effects, such as socialization. Several misconceptions of the

principles of evolutionary theory and the processes by which natural selection operates accompany these objections (Alford, Funk, and Hibbing 2008; Charney 2008; Hatemi and McDermott 2011, pg. 1-9). For political scientists to recognize the opportunities presented by integrating the methods and approaches of natural sciences, these misconceptions must be overturned so that political scientists can recognize evolutionary theory as a tool for understanding the causes of behaviour and not as a competing theoretical position. Specifically, as a theory of behaviour, evolution should be understood as; 1) a theory of gradual change, 2) dependent on past and present environmental factors, and 3) based on probabilistic not deterministic properties.

Though simple in their presentation, evolutionary principles are capable of profound influences on the life and behaviour of organisms within their environment (Cartwright, pg. 30-74; Russell et al., 2010, pg. 443-458). Evolutionary theory is a causal explanation for the development and change of organisms' characteristics and behaviours, including physiology, morphology, and social behaviour.

As a basic definition, evolution refers to a change in the inherited characteristics of a specific population over successive generations. Evolutionary changes operate predominantly through the process of natural selection (though other mechanisms, such as genetic drift do influence change). Through natural selection, traits evolve (change) in response to the material pressures of their specific environments over multiple generations (Cartwright, pg. 30-74; Russell et al., 2010, pg. 443-458). Within each environment the conditions expressed act as external constraints upon individuals, determining which characteristics will be beneficial and which will be detrimental for survival and reproduction. Selection occurs when a population meets three conditions. First, there must

be phenotypic variation between individuals.¹⁵ Second, part of this variation must be heritable, or capable of being transmitted across generations by parents to their offspring. Third, subjects with different phenotypes must differ in their ability to survive and reproduce; there must be differences in the fitness of individuals (Smith and Winterhalder 2009, pg. 26). If all three conditions are present in a population, then the influence of environmental pressures over the course of repeated generations can produce a change in the frequency of characteristics expressed in a population.

The theory of natural selection asserts that within each generation more individuals are born than can be supported by an environment. As a result, individuals are forced to compete to obtain the resources they require to survive and reproduce. Variations amongst individuals, such as height, weight, strength, and behaviour, can provide advantages allowing certain individuals a disproportionate chance of survival and reproduction (Cartwright, pg. 30-74; Russell et al., 2010, pg. 443-458). Over time, as favourable variations are disproportionately passed on through heredity, changes within a species gradually emerge. If sustained across time, these small changes can lead to permanent adaptations within a group, separating a population from its ancestors and potentially resulting in a new species (or sub species) (Cartwright, pg. 30-74; Russell et al., 2010, pg. 443-458).

¹⁵ The term 'phenotype' refers to the characteristic traits of an organism, including morphology, physiology, and behaviour (height, eye colour, or personality) but not the DNA of the subject (Smith and Winterhalder 2010, pg. 46). Variations in phenotype result from differences in genetics as well as differences in environmental factors, which can influence phenotypic (and genotypic) expression over the course of an organism's life development (ontogeny). Cultural influences, which are included among environmental factors, can also elicit "short-term" changes to behavioural responses. The proportion of phenotypic variation not produced by environmental differences is said to be heritable. While the process of natural selection requires that some proportion of an organism's phenotype is heritable, it does not require that this be 100% of a trait's expression. Selection requires that differences in phenotype exist, and that these differences result in variations in fitness such that some variants will reproduce more successfully than others. The term 'fitness' refers to the ability of an organism to survive and reproduce in comparison to the other organisms within its population. Fitness is an important measure of the evolutionary advantage possessed by an organism (Smith and Winterhalder 2010).

Within the evolutionary process, the relationship between the subject and the environment drives and ultimately determines change. As a result, the specific changes that emerge always reflect the expressed conditions of an environment, past or present (Cartwright, pg. 40-74; Russell et al., 2010, pg. 443-458). Most traits evolve for specific purposes in specific contexts. They are the product of a species' life history existing under a set of conditions that have been maintained across generations (Russell et al., 2010, pg. 443-458). Within this paradigm, trait selection is not limited to purely physical characteristics like morphology, but it is applied equally to behavioural characteristics, including emotional responses or social behaviours (Cartwright, pg. 34-70; Churchland 2011, pg. 13-15; Flint et al., 2010, pg. 60-76; Lumsden and Wilson 1981, pg. 343-354, Russell et al., 2010, pg. 443-458; Smith and Winterhalder 2009, pg. 25-61). All behaviour, therefore, including social and political attitudes, is grounded on this fundamental historical relationship, whatever the final balance between social and biological influences. As such, it is possible to understand behavioural expression according to the principles of genetics, fitness, and selection (Smith and Winterhalder 2009, pg. 25-61).

Objections raised against the inclusion of biological principles in the political sciences are commonly grounded in the assumption that such an inclusion would result in political determinism (Charney 2008). This argument misrepresents the understanding of behaviour within the evolutionary sciences in two important ways. First, the argument falsely characterizes the linkage between genes and traits as a one-to-one relationship in which the possession of specific gene results in the expression of a specific behaviour (Alford, Funk, and Hibbing 2008; Charney 2008; Smith and Winterhalder 2009). In reality, the function of genes is to serve as a template for the coding of the specific proteins that comprise the human body. While some genes do have profound effects (for example,

single mutations to the β -globin gene result in sickle-cell anaemia), most traits rely on a number of different genes' expression. Moreover, because selection acts on specific traits and not on the genes themselves, the inheritance of behaviours may be better represented to political scientists in dispositional (statistical/probabilistic) terms rather than deterministic terms (Jost et al., 2003; Jost, Federico, and Napier 2009).¹⁶ In this view, humans inherit a broad array of characteristics that influence behaviours in a variety of complex ways; for example, our genes can make us more or less sensitive to certain kinds of behaviours such as fear, or risk (Francis 2011; Jost et al., 2003; McDermott et al., 2008). In this respect it is better to think about human behaviour in terms of a spectrum of probable responses to stimuli within a series of environmental conditions rather than a set of programmed actions. As Bradley Thayer notes in his book "Darwin and International Relations: The Evolutionary Origins of War and Conflict", biology "is good probability, not destiny" (Thayer 2004, pg. 124-151). Importantly, the dispositional approach to the understanding of political behaviour is central to the treatment of behaviour in this thesis. This approach will be developed further in the second chapter of this thesis; however, it is important to note that the dispositional approach is not concerned about individuals' conscious-intentional choices or preferences. Rather the dispositional approach is strictly concerned with how individuals respond (probabilistically) to specific kinds of environmental stimuli within specific environmental contexts.

Second, the one-to-one interpretation also gives the false impression that biology and the environment must be seen as separate or competing behavioural explanations. In reality, the phenotype of an organism is not simply the product of the genes an organism

¹⁶ Humans do, in reality, possess a number of programmed behaviours, responses, and heuristics that influence our behaviour in numerous ways. Many of these processes operate below the level of conscious recognition and are later interpreted by our conscious brain as being conscious decisions (Chen and Chklovskii 2006; de Winter and Oxnard 2001; Kitayama 2003; Eaves, Eysenck, Martin 1989). However, these processes are strongly influenced by ontogenetic factors in addition to genetic influences (Geary 2005; Wolford, Miller, and Gazzaniga 2004).

possesses, but is strongly influenced by environmental conditions, which can have a regulatory effect on gene expression. Exposure to different environmental conditions can cause various genes to turn on and off, affecting the production of proteins in the body. These interactions can have considerable effects on both physical appearance and behaviour. In extreme cases these effects can lead to permanent changes that affect an organism throughout their life cycle (Francis 2011).

Understanding behaviour in the biological sciences is therefore based on the combination of genetic and environmental influences. Within this ongoing and dynamic relationship the genes possessed by an organism can and do place restrictions upon an organism's behaviour. However, the influence of genetic material should not necessarily be viewed as deterministic as genes provide the material foundation upon which environmental factors act to induce change. From the biological perspective, constructing a methodology that aims to understand behaviour independently of biological influences is to fundamentally misunderstand the nature of behavioural expression and function for an organism. By viewing socio-political attitudes and behaviours as independent of biological influences, the predominant approaches within political science are unjustly claiming that politics is an exceptional state of human behaviour (Tooby, and Cosmides 1992). This claim cannot be justified in light of the biological evidence for the nature of behaviour and behavioural development.

Section 15: Evolutionary Perspective

From the perspective of the evolutionary sciences, the heritability of political attitudes is an interesting research problem as the inheritance of a trait typically implies that this trait possesses an adaptive utility; that the trait contributes, or has historically contributed to, an organism's disproportionate chances of survival and reproduction

(Smith and Winterhalder 2009, pg. 26). Given that the heritability of a trait implies a contribution to individual utility, then as heritable traits, investigating the adaptive utility underlying different political attitudes and orientations may provide significant insight into the evolutionary dimensions of human social behaviour - an important research area within the evolutionary sciences. The point is that the heritability of political attitudes and orientations establishes that there is some form of causal connection between political differences and human evolution. Though the heritability alone is not sufficient to establish that these traits are the product of direct, as opposed to indirect selection, it is sufficient to justify investigating the potential adaptive significance of these traits for individual survival and reproduction.

From the perspective of the political sciences, investigating the potential adaptive utility of behavioural differences associated with different political orientations can provide researchers with a more complete picture of the deep causal processes that contribute to the expression of political differences. This project focuses on studying whether groups of individuals with shared political orientations also share behavioural traits or sensitivities to certain specific environmental conditions. In studying these relationships, I wish to examine whether the interaction between these traits and environmental conditions produces specific behavioural outcomes that can be viewed, within an evolutionary framework, as more or less advantageous for individuals' fitness and utility. In doing so, I hope to expand the present understanding of the causal process contributing to ideology, and political differences more generally, by encouraging researchers to examine deep causal processes underlying the expression of human behaviour.

Summary of Thesis Chapters

This chapter introduced the approach and methods adopted in this research for the study of political ideology. Focusing on the nature of liberal and conservative orientations, I employ an evolutionary framework that aims to consider whether the characteristics associated with these two orientations is rooted in alternative adaptive strategies for social interaction, and specifically strategies to maximize returns from social interaction. To investigate this question, I employ an experimental methodology, which studies how behavioural characteristics correlating with heritable political attitudes and orientations affect behaviour during social interactions involving trust and cooperation.

In Chapter 2 of this thesis, I review the existing research from political biology on the behavioural differences associated with liberal and conservative political orientations. After reviewing this literature I outline two competing theoretical frameworks to account for the adaptive utility of these two different political orientations, the Group Reciprocity Hypothesis (GRH) and the Social Risk Hypothesis (SRH). I then detail the protocols and objectives for each of the three experiments as well as the predicted behaviour outcomes for each of the two frameworks.

In Chapters 3, 4, and 5, I present the experimental results obtained in each of the experiments conducted. I provide a full breakdown of the success of each theoretical framework in predicting the behavioural outcomes of liberal and conservative individuals.

In Chapter 6, I interpret overall experimental results, including the prediction of the GRH and SRH frameworks. I also give specific attention to addressing evolutionary questions regarding the function and utilities of any observed behavioural differences, including concerns about the ability to discern the selective pressures responsible for the observed behavioural outcomes as well as the possibility for “mismatch” or preadaptation.

I also outline several possibilities for further into the causes of liberal and conservatives differences that develop out of the results of the research conducted in this thesis.

Chapter Two: Biological Foundations of Political Differences

Introduction to Liberal-Conservative Differences as Behavioural Strategies

The following chapter outlines the theoretical frameworks used to investigate the evolutionary influences on liberal and conservative ideological orientations. As outlined in the introduction, I focus on understanding the causes of different ideological orientations by studying the utility of behavioural differences associated with each orientation during social interactions. In doing so, I attempt to demonstrate that liberal and conservative orientations can be viewed as alternative adaptive strategies for social interaction. In arguing this position I adopt an individualistic spatial approach to the study of political ideology and orientation, which is informed by evolutionary and psychological principles. In this Chapter I present two competing hypotheses to account for the behavioural utility underlying different ideological orientations; 1) *the Group Reciprocity Hypothesis (GRH)* and, 2) *the Social Risk Hypothesis (SRH)*. Behavioural utility refers to the benefits to fitness an *individual actor*, as opposed to a group, receives from expressing a specific trait or behaviour. Traits may contribute to utility by providing positive returns or by helping individuals to avoid costly outcomes. I attempt to capture the utility of behaviours associated with liberal and conservative orientations by measuring changes in individuals' levels of social interaction, trust and cooperation, under different environmental conditions. Within the GRH and SRH, the presence of two behavioural strategies is explained as a result of frequency dependent selection reflecting evolutionary trade-offs for social interaction.

Drawing on the theories of “motivated social cognition” (Jost and Amodio 2012; Jost et al., 2003; Jost 2006; Jost 2009; Jost, Federico, and Napier 2009) “reciprocal altruism” and “indirect reciprocity” (Trivers 1971; Trivers 1985), the Group Reciprocity Hypothesis (GRH) views ideological differences as a result of alternative behavioural

strategies that attempt to maximize returns from social interaction by increasing the absolute levels of reciprocity between individuals. The term ‘absolute level of reciprocity’ refers to the extent to which individuals reciprocate with partners –ranging from altruistic to unfair reciprocation – as well as the frequency with which individuals engage in social interactions with individuals or social groups. Informed by studies on the effect of social identity on socialization, the GRH is modeled on the on the assumption that reciprocity will reflect in-group out-group behavioural dimension with reciprocity increasing in response to shared social preferences and decreasing in response to unshared social preferences (Yamagishi, Nobuhito, and Tohko 1999). The strategy of conservative individuals’ attempts to maximize social returns is through the establishment and maintenance of social norms, structures, and hierarchies, which foster greater levels of reciprocation and interaction between individuals through social pressure and shared identity (Price 2006; Sosis and Bressler 2003; Sosis and Ruffle 2004). Conforming to the established rules may provide individuals with reputational benefits by signaling potential social partners about an individual’s trustworthiness while drawing attention to potential social violators (Price 2006; Sosis and Bressler 2003). Moreover, advocating for, and adhering to, established norms and structures may provide disproportionate benefits to high status individuals who benefit from social inequalities (Sell et al., 2009; Sell, Tooby, and Cosmides 2009). According to the GRH, conservative individuals should be strongly sensitive to conditions of normative stability or conformity and the presence of structured social environments (Sosis and Bressler 2003; Sosis and Ruffle 2004).

In comparison, the strategy of liberal individuals is to increase levels of reciprocity by opposing obstacles to social interaction, such as inequality, which cause individuals to withhold their cooperation and reciprocation from social interactions (West et al., 2006). By signaling their opposition to inequality, including social dominance and hierarchy, this strategy attempts to directly communicate their trustworthiness to social partners (Gintis,

Smith, and Bowles 2001). By being less concerned about reputation and shared identity, liberal individuals may expose themselves to a larger number of potential social partners; however, in doing so they incur a greater risk of exploitation. According to the GRH, liberal individuals should be strongly sensitive to conditions of inequality.

Based on this framework, the GRH predicts that *levels of trust among liberal and conservative oriented individuals will be sensitive to implicit social attitudes related to social change and inequality*. Importantly, the GRH maintains that if, implicit attitudes related to social change and inequality are reflective of alternative social strategies, then the presence of shared attitudes should provide a clear (salient) social cue of a potential social partner's trustworthiness; i.e. likeliness to reciprocate (Price 2006; Sosis and Bressler 2003). If true, the GRH expects that the effect of implicit attitudes on trust should be greater than effect of a shared "minimal" identities (Van Vugt and Van Lange 2006; Yamagishi and Mifune 2008; Yamagishi, Nobuhito, and Tohko 1999).¹⁷ The GRH predicts that *among conservative individuals knowledge that a social partner has strong preferences for a normatively stable and well-structured social environment will significantly increase trust. Among liberal individuals the GRH predicts that trust will be significantly increased by knowledge that a social partner has preferences for a normatively flexible and egalitarian social environment*.

The Social Risk Hypothesis (SRH), which also draws upon the theories of "motivated social cognition" as well as "reciprocal altruism" and "indirect reciprocity" (Jost et al., 2003; Jost 2006; Jost et al., 2009; Trivers 1971; Trivers 1985), similarly understands political differences to be the result of adaptive strategies to maximize returns from social interaction. However, where the GRH views these differences as strategies for

¹⁷ Minimal identities are a concept from social identity theory. Minimal identities reflect shared preferences for an arbitrary social phenomenon which can be used to identify or categorize individuals into groups, but which do not provide insight into an individual's deeper values, motivations, or intentions. Examples include preferences for specific foods, sports, art (Turner, Brown, and Tajfel 1979; Yamagishi and Mifune 2008; Yamagishi, Nobuhito, and Tohko 1999).

increasing absolute levels of reciprocity between individuals, the SRH sees these differences as strategies to avoid social-environmental risks, specifically the costs of exploitation.

Studies find that the decision-making processes of conservative individuals are more sensitive to negative emotions and have an externally oriented locus of attention, indicating a greater disposition towards detecting a potential threat (Kanai et al., 2011; Oxley et al., 2008; Schreiber et al., 2013). Based on this framework, the SRH predicts *that conservative individuals will be more sensitive to negative environmental stimuli than liberal individuals, and that this sensitivity will reduce their willingness to participate in social interactions following the observation of a negative social cue.*

Similarly, experimental studies find that liberal individuals have a greater sensitivity to positive stimuli. Studies also find that liberal individuals place greater emphasis on internal emotional cues during risky decision-making and are more likely to adjust their habitual responses after receiving new information (Amodio et al., 2007; Schreiber et al., 2013). The SRH predicts that *liberal individuals will be initially more wary of social interaction than conservative individuals, but will be strongly sensitive to positive social-environmental cues about the likelihood of obtaining reciprocity.*

In the proceeding sections I lay out the foundations required to understand the adaptive significance of political differences as well as the theoretical justification behind the GRH and SRH. In Section 1, I briefly discuss two important evolutionary considerations concerning the expression of two different behavioural strategies within a population. In Section 2, I introduce the dispositional approach to the study of behavioural differences. In Section 3, I review the existing literature on the behavioural differences associated with liberal and conservative ideological orientations, focusing specifically on differences in cognition and physiology. In Section 4, using examples from behavioural psychology, I develop the concept of behavioural strategies and the understanding that

behavioural variation is an evolutionary mechanism used to account for conditions of environmental uncertainty. Collectively, Sections 2 and 4 are aimed at a political science audience who maybe unfamiliar with the understanding of, and approach to, behaviour in the life sciences and psychology. In Section 5, I return the Group Reciprocity and Social Risk Hypotheses, providing a more detailed explanation for each of these frameworks. In Section 6, I outline the three experiments conducted in this research as well as the expected outcomes for both the GRH and SRH in each experiment.

Section 1: Frequency Dependence and the Evolution of Alternative Social Strategies

Within evolutionary theory the presence of two competing behavioural strategies within a single species requires further explanation because, in the absence of unique selection pressures, evolutionary principles expect that variations in behaviour would converge around a single trait. To account for the presence of two competing behavioural strategies I rely on two concepts to explain the functional and evolutionary benefits associated with competing strategies; first is the idea of evolutionary tradeoffs, and second, is the concept of frequency dependence (Axelrod 1984; Hirschleifer and Coll 1988; Nowak 2006; Shovel 2012).¹⁸

In evolutionary theory a tradeoff is the idea that an individual agent may lose one characteristic, for example a behaviour, in exchange for gaining an alternative characteristic. In biology the concept of a tradeoff is linked to restrictions placed on organisms by their physiology and environment. Given that a phenotype cannot be optimal

¹⁸ Sickle Cell Anemia is an example strategic variation in countries with high rates of Malaria. While Sickle Cell Anemia significantly lowers life expectancy, individuals with Sickle Cell Anemia are more resistant to the effects of Malaria. In environments with high penetration of Malaria, individuals with Sickle Cell have an increased window of opportunity to engage in sexual reproduction than non-Sickle Cell individuals with Malaria increasing their fitness within the population.

for all tasks, individuals within a population may be expected to show variation across a trait or range of traits, provided these variations contribute to individuals' utility by allowing individuals to better exploit *alternative* features of their surrounding environment (Shovel et al., 2012; Van Vugt and Van Lange 2006). Within this project I am interested in whether behavioural differences associated with liberal and conservative political orientations can be viewed as different strategies to maximize reciprocity and minimize risk under different socio-environmental conditions.

A useful example to capture the importance of tradeoffs is the study by Hare et al., (2007). Hare et al., compared the abilities of Chimpanzees and Bonobos to cooperate to solve a series of complex tasks. The objective of this experiment was to compare the utility of different cooperative styles for obtaining social rewards. In Chimpanzees, cooperative behaviours emerge through coalitions of individuals and are geared towards behaviours for obtaining high value resources that are difficult for individuals to obtain alone; for example hunting. In Chimpanzees, cooperation is highly self-interested, social groups are strongly hierarchical, and food sharing is predominantly between male coalitional partners or between mother and offspring. However, despite its self-interested nature cooperative hunting in Chimpanzees is highly effective at obtaining valuable food resources. In comparison, Bonobos belong to egalitarian social groups where cooperative behaviours such as food sharing are common between all individuals, as opposed to being restricted to coalitional partners, even for high value resources (Fruth and Hohmann 2002). As part of their experiment, Hare et al., manipulated the rewards pairs could obtain by cooperating. These rewards consisted of either a food source that could be easily shared or that could be easily monopolized. They find that, when the reward is something that is easily shared, two grapes, chimpanzees and bonobos are both successful at cooperation. However, when the reward is something that could be easily monopolized, a single grape, bonobos continued to cooperate successfully, while chimpanzees failed to coordinate to obtain the

reward. These results demonstrate that, while the social hierarchies and coalitional structures maybe extremely effective for producing cooperative behaviours under certain conditions, for example hunting, this effectiveness breaks down when the opportunities for individuals to share the returns are limited, or when the risks of exploitation are high (Boesch and Boesch-Acherman 2000; Fruth and Hohmann 2002; Hare et al., 2007; Mitani and Watts 2001). Under these conditions, cooperative strategies based on principles of egalitarianism and general reciprocity may be more effective at producing cooperative outcomes. The idea that differences in behaviour reflect different strategies or tradeoffs for resolving different kinds of socio-environmental challenges is central to the understanding of behavioural variation in the life sciences and the understanding of liberal and conservative orientation within this research.¹⁹

The second concept necessary for understanding behavioural strategies is frequency dependence. Frequency dependence, or frequency-dependent selection, occurs when the fitness or utility of a phenotype, or trait, depends on its frequency or distribution within a population. Frequency dependence can be positive, when the utility of a phenotype is increased as it becomes more common within a population, or negative, when the utility of a phenotype increases when it is less common within a population. An example familiar to political scientists are the hawk and dove strategies in both

¹⁹ Research on the evolution of cooperation often focuses on studying the kind of adaptive problems individuals would need to overcome as a method to study the evolution of cooperation. In the “hunting hypothesis,” individuals will form coalitions and will cooperate out of mutual self-interest in order to solve problems too complex for single individuals, such as hunting difficult to capture prey, but which are highly rewarding to individual fitness. According to this hypothesis individuals should be both highly capable of engaging in cooperative behaviours as well as sharing the potential outcomes. An alternative view is the “emotional reactivity hypothesis,” which suggests that cooperative skills evolved as by-productions of selection on cognitive systems for behavioural regulation; for example, cognitive systems that decrease fearful or aggressive behaviour. Here, the presence of dispositions more conducive to social behaviour allowed for continued selection towards systems capable of supporting cooperative behaviour. As a result individuals became capable of cooperative behaviours because they developed cognitive systems capable of tolerating interaction with other individuals. According to this hypothesis individuals should be highly tolerant of other social actors and should be highly flexible during cooperative behaviours (Buesch and Buesch-Ackermann 2000; Fruth and Hohmann 2002; Hare et al., 2007; Mitani and Watts 2001).

Evolutionary and International Relations theory. Within this analogy a hawk's fitness decreases as the number of hawks in a population increases relative to the number of doves. This decrease in fitness is a result of an increased likelihood of sustaining injuries in combat with other hawks. However, as the number of hawks decreases relative to the number of doves the fitness of this strategy increases, as hawks earn more rewards from stealing the resources from doves and fewer injuries for competing with other hawks (Nowak and May 1992; Nowak and Sigmund 2005; Smith and Winterhalder 2009, pg. 35).

Frequency Dependence vs. Life History Strategies

Before continuing the discussion on the theoretical framework supporting this research it must be noted that frequency dependence is just one of several possible mechanisms to account for the existence of multiple heritable strategies within a population. One alternative to frequency dependent selection, which is favoured by researchers in evolutionary psychology, is the idea of life history strategies, which attempt to understand the existence of behavioural variation in terms of different investments in an organism's growth, reproduction, and survivorship.

The key distinction between these two approaches is the relationship between inheritance and behaviour. Under frequency dependent selection differences in behavioural strategies are a result of discrete heritable behaviours. Here, individual A inherits a behavioural trait that is distinct from the behavioural trait inherited by individual B. Under the life history model, individuals inherit a universal set of behaviours, or a toolbox, that is capable of expressing multiple strategies.²⁰ Within this toolbox model behavioural

²⁰ Evolutionary psychologists argue that it is unlikely that humans have significant differences in heritable behaviour as the process of selection, which favours adaptive characteristics, will over multiple generations limit the amount of variability within a population removing or constraining such variations (Tooby and Cosmides 1990). Instead of heritable variations in behaviour evolutionary psychologists argue that the range and complexity of many adaptive problems favours the development of a universal and complex set of

differences develop through the interaction of individuals' other characteristics, such as physical stature, with their external environment (Mcelreath and Strimling 2006; Tooby and Cosmides 1990).

A popular example of the life history model is the development of personality traits. Evolutionary psychologists note that personality traits such as social dominance or aggression have an established heredity that leads many researchers to conclude that these traits are the product of adaptive selection and are passed directly through heredity. However, evolutionary psychologists point out that the traits of social dominance and aggression are also highly correlated with individual size and strength, which are *established* as the product of adaptive selection, and which are *also* hereditary. Based on this observation, evolutionary psychologists question whether individuals are inheriting specific personality traits, such as social dominance and aggression, or whether individuals are inheriting certain physical characteristics, like body size, which allows them to behave more aggressively towards others individuals with smaller body sizes. In other words, the life history model argues that individuals do not necessarily inherit different behavioural characteristics such as personality traits, but instead, develop these differences as a consequence of environmental interaction and experience.²¹

Within the study of evolution and behavioural research, decisions to apply frequency dependent or life history approaches typically reflect disciplinary ties. Historically, researchers in evolutionary biology, whose projects are often informed by studies of genetics and genetic variation, tend to place greater emphasis on the heritability

behaviours whose plasticity is capable of responding to a variety of adaptive problems (Tooby and Cosmides 1990).

²¹ For example, using a mathematical model of the relationship between predation, body size, and foraging behaviour, Mcelreath and Strimling (2006) demonstrate that differences in individual's physical attributes can produce significant differences in behavioural traits. For example, faced with the problem of weighting the costs and benefits of foraging and avoiding predators Mcelreath and Strimling's show that smaller individuals, who are faced increased risk of being eaten while receiving smaller rewards from foraging, are more likely to display skittish or timid behaviour in order to avoid predation. By comparison, larger individuals, who are at a decreased risk of being eaten but receive larger reward from foraging, are more likely to display boldness or assertive behaviour and continuing to forage even in the presence of predators.

of behavioural variation and in doing so gravitate towards frequency dependent models (Tooby and Cosmides 1990). By comparison, evolutionary psychology, which places greater emphasis on species level characteristics, tends to emphasize life history models. While stark distinctions between these positions are often presented in formalized models, in practice most researchers recognize that the overall phenotype of a particular species likely reflects both life history strategies and frequency dependent selection.

Accordingly, while this thesis adopts an understanding of ideological difference that is informed by frequency dependence it is possible that a proportion of behavioural differences associated with liberal and conservative ideological orientations may be better explained in terms of life history strategies. Future studies will be required to investigate how each of these models is best applied. While the decision to rely on a frequency dependent model is partially influenced by my own previous experience in evolutionary biology, it is also informed by research suggesting that the environment may have a limited role in the development of the behavioural differences associated with ideological orientation, and that much of the behavioural variation observed is passed through heredity.

For example, a longitudinal study by Block and Block finds that behavioural traits, such as feelings of insecurity or dependence in children, strongly predicts ideological orientation in adulthood. Given the young ages of the children in the study, ages three and four, it is possible that a significant proportion of the behavioural variation in individuals may be inherited (Block and Block 2006).

Research on identical twins reared in separate environments demonstrates that a significant degree of behavioural variation may be directly heritable, and consequently opens the question of whether this variation has, or previously had, an adaptive function (Bouchard et al., 2003; McCourt et al., 1999; Waller et al., 1990). For example, Bouchard

et al., (2003) find that monozygotic twins raised in separate environments show more consistent social attitudes than dizygotic twins raised in shared environments (Bouchard et al., 2003). As discussed in the introduction, given that the only way to determine if these traits are actually the product of adaptive selection is to test their utility, I proceed on the basis that the consistency of behaviour between twins raised in different environments is sufficient to justify the assumption that these similarities are linked to adaptive characteristics.

Finally, research by Settle et al., (2010) demonstrates a significant interaction between genetics, environmental factors, and ideological orientation. Specifically, Settle et al., find that the interaction between the 7R variant of the dopamine receptor gene D4 and the number of friendships an individual has during adolescence significantly predicts a liberal ideological orientation (Settle et al., 2010). While this observation is in keeping with the life history model perspective, that environmental experiences are fundamental in shaping our behaviours, it also highlights the instrumental role played by genetic variation in transforming environmental experiences into different expressions of behaviour.

Based on these considerations I rely on a model of frequency dependent selection to account for the heritable variation in behaviour expressed by liberals and conservatives; however, I remain open to the possibility that a significant portion of the total variation in behaviour may be a consequence of differences in life history strategies.

Accordingly, this thesis maintains that, as alternative strategies for maximizing returns from social interaction, the evolution of liberal and conservative differences is best accounted for by the conditions of frequency dependence.

Within the framework of the GRH, liberal and conservative differences reflect strategies to increase the absolute level of reciprocity between individuals. The strategy of conservative individuals is positive frequency dependent. Here, individuals signal

themselves as trustworthy to potential social partners by adhering to established social norms and behaviours, while simultaneously drawing attention to untrustworthy partners who fail to adhere to the same norms (Van Vugt and Van Lange 2006). This strategy may be particularly beneficial for high status individuals who are able to leverage their greater access to resources to maintain a larger number of beneficial social relationships (Hardy and Van Vugt 2006; Price 2006; Sell et al., 2009; Sell, Tooby, and Cosmides 2009; Smith et al., 2016). However, when the number of individuals employing this strategy is small, individuals lose opportunities to enforce reciprocation due to a lack of normative pressure. They also have diminished reputational benefits, as following specific social norms becomes a less salient social cue for individuals in a population to identify trustworthy and untrustworthy social partners. In these conditions, the costs of maintaining a reputation by following specific norms may not outweigh the benefits obtained in social interactions (Van Vugt and Van Lange 2006).

The strategy of the liberal individuals is also positive frequency dependent. Here, individuals avoid the high costs of maintaining a social reputation by following established norms and hierarchies and signaling their desire to engage in reciprocity directly. However, because it lacks a mechanism to track individuals' reputations and identify potential cheaters this strategy may be vulnerable to exploitation in environments where the frequency of actors employing a similar strategy is low.

Comparatively, within the SRH, the utility of liberal and conservative differences is a function of social risks and consequently depends on the frequency of defectors in a population (Nowak and Sigmund 2005; Price 2006; Van Vugt 2006). The strategy of conservative individuals, which is more willing to engage in social interaction, is positive frequency dependent. Here, the fitness of this strategy depends on the number of individuals wishing to engage openly in social interaction, as well as the number of defectors in a population. As the number of exploiters increases, the fitness of conservative

individuals decreases. By comparison, the strategy of liberal individuals, which is a strategy of “wary cooperation”, increases in fitness as the number of individuals employing a strategy of exploitation increases (Hibbing and Alford 2004). However, it decreases in fitness as the number of defectors decreases, as wary individuals may miss out on opportunities to engage in beneficial interactions in comparison to more risk accepting social strategies (Takezawa and Price 2010). In Chapter 6 of this thesis I return to the discussion of frequency dependent strategies in light of the outcomes obtained in each of the three experiments.

Section 2: Dispositions and Left-Right Behavioural Differences

Studies in genetics, politics, psychology, physiology, and neuroscience identify a number of behavioural differences among individuals who identify as having liberal or conservative ideological orientations. These differences include personality traits, cognitive behaviours, physiological responses, and learning strategies. In the following section I outline the concept of a behavioural disposition and its relevance for understanding socio-political behaviours. I then review the existing literature on behavioural dispositions associated with people who identify as being politically liberal and conservative. The objective is to develop, for a political science audience, the understanding of how differences in political orientation reflect differences in the biological machinery individuals use to engage with and experience their surrounding environment.

Understanding Dispositions

Dispositions are an important concept in behavioural research. While the term disposition is commonly associated with psychology, the concept of a disposition is also important to biological approaches to behaviour. As behavioural traits, dispositions are often associated with a person's inherent qualities of mind and character, their temperament, nature, constitution, or mentality. However, in the context of behavioural research, and the methodology of this project, dispositions are better understood *as a tendency or state of readiness to act in a specific way in response to specific types of environmental stimuli*. For example, the “fight or flight” response disposes individuals to jump back in response to a startling stimuli, e.g. a snake, but the appearance of a snake doesn't necessarily cause individuals to be startled and jump back (Gazzaniga 2011, 77). Within this perspective dispositions exist to facilitate an organism's response to, or interpretation of, an environmental stimulus. Dispositions often develop through a combination of heritable and environmental factors; for example, dispositions can change with age, social status, social context, sex, health, and physical size. When linked with heredity, specific dispositions, or the mechanisms contributing to the expression of dispositions, are typically viewed as adaptive behaviours or as adaptive strategies for specific environmental conditions (Geary 2005; Pinker 2003)

Importantly, depending on their dispositions, different individuals may experience the same sensory information in radically different ways. This difference in experience results from the fact that perception, unlike reception, is an active and creative process in which raw unaltered sensory data, delivered from our sensory systems, is organized and given meaning within the brain (Passer et al., 2001, pg. 196-197; Purvers et al., 2008, pg. 289-310). Culture for example can have a significant impact on how individuals perceive and process information. Richard Nisbett has studied behaviour dispositions by examining

how individuals from individual centric and group centric cultures process and categorize objects. In one experiment Nisbett presented American and Mainland Chinese and Taiwanese students with a series of three words “panda, monkey, banana” and asked them to indicate which of the two words were most closely related. The results showed that Americans preferred to group objects according to categories like group membership “panda-monkey” while Chinese preference to group objects by association “monkey-banana” (Nisbett 2010, pg. 141). As a result of our dispositions, human experiences - including social-environmental interactions - do not exist as one-to-one reflections of what is present in the world but contain an inherent element of construction. In other words, dispositions affect how individuals perceive, respond to, or interpret different stimuli, the result of which is that individuals can experience or perceive stimuli in radically different ways (Passer et al., 2001, pg. 195-197, Purvers et al., 2008, pg. 289-310).

The fact that individuals differ in their sensitivities or responses to environmental information, and that these differences are supported by differences in a physiological substrate, is an important concept underlying the approach to political differences utilized in this research. It also distinguishes the evolutionary approach from economic approaches to behaviour, such as rational choice theory, which assumes that individuals are uniform in their perception of a particular treatment, and that differences in behaviour are the result of differences in individuals’ conscious preferences or interests for specific outcomes (Green and Shapiro 1994). While dispositions exist to influence behavioural outcomes, the individuals possessing these dispositions are typically not aware of their original adaptive function. Moreover, the adaptive function of an evolved disposition does not necessarily reflect the conscious motivations or rationalizations of a particular actor (Gazzaniga 2011, 75-103). Accordingly, in its approach to the study of behaviour, an evolutionary framework avoids consideration about actor’s explicit conscious motivations and interests

and focuses on benefits of a particular outcome for individual fitness (or some correlated proxy) (Smith and Winterhalder 2009, pg. 39-42).

Important to the interpretation of liberal and conservative behavioural differences as alternative adaptive strategies is the possibility that these are a product of behavioural mismatch. The mismatch theory maintains that an organism may possess inherited traits, such as behaviours or dispositions, which evolved in past environments to fulfill some adaptive function. However, if the contemporary environments are significantly different, these traits may become “mismatched” resulting in outcomes that are not necessarily adaptive (Johnson 2004; Johnson, Stopka, and Knights 2003).²²

It is therefore important to consider whether liberal and conservative behavioural differences are in fact a result of adaptive social behaviours or behaviours adapted for past environmental conditions. In the GRH, the prediction that individuals will show positive responses to specific implicit attitudes as compared to other social cues is specific enough that it is highly unlikely that these outcomes will be a result of evolutionary mismatch. In the SRH however, the prediction that liberals and conservatives will differ in their sensitivity to positive and negative social cues is not specific enough to discount the possibility that these differences could be a result of some alternative adaptive behaviour. Specifically, it remains possible that liberal differences could be a product of *general* environmental adaptations as opposed to *specific* adaptations for social behaviour.²³ This possibility will be discussed more in Chapter 6 during the interpretation of results.

²² Based on research on warfare among early humans and other hominid species Johnson (2004) predicted that the onset of armed conflict in contemporary environments would correlate to the differences in relative number of combatants between groups. Using this model Johnson (2004) was able to explain why groups would initiate armed conflicts even when they lacked a strategic advantage (Johnson 2004; Johnson 2009).

²³ While the behavioural differences associated with liberal and conservative individuals may be a product of historical environmental processes rather than adaptive social behaviours, this possibility does not preclude the fact that these behaviours may have made or continue to make a significant contribution to individual fitness and utility. Referred to as preadaptation, evolution is notorious for recycling past adaptive behaviours into new adaptive functions. In considering whether liberal-conservative behavioural differences may be a product of mismatch, attention is also given as to whether how these differences may continue to impact social interaction (Hare and Tomasello 2005; Johnson 2004; Johnson 2009).

Section 3: Literature on Left/Liberal and Right/Conservative Behavioural Differences

Personality Traits and General Dispositions

Research in psychology and political psychology has a long history of investigating the dispositions associated with political differences. The result is an extensive literature on the traits, behaviours, and environmental responses associated with individuals who identify as liberal or conservative. This research indicates that, in comparison to liberal oriented individuals, conservative oriented individuals maintain more closed (often kin-oriented) social groups (Schaller and Murray 2008; Tuschman 2013). Conservative oriented individuals have stronger preferences for social rituals, social hierarchies, and normative structures than liberal oriented individuals - including maintaining traditional moral values (Sosis 2000; Sosis and Bressler 2003; Sosis and Ruffle 2004). They are more likely to have organizational tools in and around their workspaces, but they also tend to be intolerant of ambiguity and complexity (Jost 2006; Jost 2009; Jost and Amodio 2012; Jost, Federico, and Napier 2009; Tomkins 1963). By comparison, liberal oriented individuals have greater tendencies towards creative, but also disorganized behaviours. They are also more tolerant of ambiguity and complexity.

In a seminal study Jost et al., (2003) conduct a meta-analysis of 88 research samples conducted in 12 countries over a period of 40 years. They identify a number of dispositions associated with liberal or conservative orientations (Jost et al., 2003; Jost and Amodio 2012). Jost et al., find that death anxiety, fear of system instability, fear of threat and loss, dogmatism, intolerance of ambiguity, and personal needs for order, structure, and closure were all positively associated with conservatism or negatively associated with liberalism. Conversely, openness to new experiences, cognitive complexity, tolerance of uncertainty, and self-esteem were all positively associated with liberalism or negatively associated with conservatism (Jost et al., 2003)

Most importantly, studies show liberal and conservative oriented individuals consistently differ on two of the “Big 5” personality traits, “Conscientiousness” and “Openness to Experience”. In psychology, the Big 5 personality traits are broad characteristic dimensions used to describe or characterize human personalities. These are Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (also called Emotional Stability). Gerber et al., point out that in psychology personality traits are referred to as “dispositional or core traits” (Gerber et al., 2011, pg. 2). This label “differentiates the Big Five from other aspects of individuals’ personality such as their characteristic adaptations (values, attitudes, interests), self-concepts (self-esteem, identity) and objective biography (careers, background)” (Gerber et al., 2011, pg. 2).

Unlike these other aspects of an individual’s personality, personality traits are shown to be stable across an individual’s lifetime, and are strongly heritable (Caspi et al., 2005; Bouchard 1997; Plomin, DeFries, and McClearn 1990; Van Gestel & Van Broeckhoven 2003; Eaves et al., 1999). Conscientiousness, the concern about the correct behaviour, is much more likely to be expressed in conservative oriented individuals, while Openness to Experience, the desire for new sensation seeking, is much more likely to be expressed in liberal oriented individuals (Caprara et al., 2006; Charney 2008; Charney 2008; Eaves 1999; Gerber et al., 2010; Jost 2003; Jost, Nosek, Gosling 2008; Jost, Federico, and Napier 2009; Lewis and Bates 2011). Some studies also suggest associations between liberal and conservative orientations and the remaining Big Five traits. Though less consistent than the relationship between Openness and Conscientiousness, studies find a correlation between Agreeableness, Emotional Stability, and social conservatism (Mondak 2010; Gerber et al., 2011). The fact that individuals with different political orientations differ on the Big Five personality traits is significant for this project as it demonstrates that individuals have behavioural differences, which influence not only how we receive, but also how we respond to environmental experiences.

Cognitive Behaviour

Recently, research in neuroscience has begun to investigate how differences in cognitive activity and brain structure relate to differences in political orientation.

In 2007, Amodio et al., investigated whether liberals and conservatives employ different cognitive styles.²⁴ Previous research indicated that conservatives utilize more structured and persistent cognitive styles, whereas liberals were more responsive to informational complexity, ambiguity, and novelty (Jost et al., 2003). To investigate these differences, Amodio et al., tested whether potential differences in cognitive style reflected differences in general neurocognitive functioning using event-related potentials based on a go/no-go task. Using scalp recorded voltage changes reflecting the concerted firing of neurons in response to a psychological event, Amodio et al., find that greater liberalism is associated with stronger conflict-related anterior cingulate activity in the brain, suggesting greater neurocognitive sensitivity to cues for altering a habitual response pattern. The results indicated that differences in the functioning of the general mechanisms related to cognitive control and self-regulation are consistent with the identification of participants as liberal or conservative, supporting the conclusion that liberal and conservative individuals employ different cognitive styles, and that they think about and perceive social-environmental conditions differently.

In 2011, Kanai et al., examined whether liberal and conservative political orientation reflects differences in grey matter volume of specific brain regions. They find that greater liberalism is associated with an increase in grey matter volume in the anterior cingulate cortex, whereas greater conservatism is associated with an increase in volume in the right amygdala. The anterior cingulate cortex, or ACC, is an area of the brain linked to

²⁴ Cognitive style is a term used in cognitive psychology to describe the way individuals think, perceive, and remember information. Differences in cognitive style may reflect differences in the cognitive centers and psychological processes used within the brain to process information (Amodio et al., 2007).

affective decision-making and altering habitual response patterns. The study by Amodio et al., (2007) demonstrated that liberals showed higher activity in the ACC during conflict-processing related tasks. The right amygdala is an area of the brain linked to the processing of negative emotional stimuli, including threatening imagery. While Kanai et al.'s results do not determine if these regions cause the formation of political attitudes, they provide insights which explain why liberals and conservatives respond differently when confronted with the same social stimuli, which may potentially account for why liberal and conservative individuals focus on different social issues.

Based on previous research demonstrating differences in the cognitive style and brain structure of liberal and conservative oriented individuals, Schreiber et al., (2013) used fMRI to examine whether differences in areas of brain activity/oxygenation are observed during a risk-taking task. They find that, while risky behaviour did not differ between liberals and conservatives, the brain activity associated with this behaviour did differ. Liberals showed significantly greater activity in the left insula cortex, while conservatives showed significantly greater activity in the right amygdala. The left insula cortex is involved in the representation of internal bodily cues for subjective feeling states and emotional regulation related to signalling potential changes in interceptive state, as well as to changes in possible decision-related outcomes. Activity in the right amygdala is strongly linked to the specific processing of negative emotional stimuli (citation). Using this data, Schreiber et al., generated a two-parameter model of partisanship based on amygdala and insula activations, which resulted in a better model prediction at 79% of variation, than the well-established model based on parental socialization of party identification at 69% of variation (Achen 2002 in Schreiber et al., 2013). Based on the differences in the brain regions activated in the study, the results indicate that liberals and conservatives engage different cognitive processes when they think about risk. Specifically, liberal individuals focus more on their own internal psychological feeling

states, while conservative individuals focus on external and negative factors. Consistent with the finding of Jost et al., 2003, and Oxley et al., 2008 the results of Schreiber et al., also support recent evidence that conservatives show greater sensitivity to threatening stimuli.

Zamboni et al., (2009) used multidimensional scaling and fMRI to identify which criteria/dimensions people use to structure complex political beliefs and which brain regions are concurrently activated.²⁵ They find three independent dimensions are associated with the variability of a set of statements expressing political beliefs, and that each dimension was reflected in a distinctive pattern of neural activation: 1) Individualism -medial prefrontal cortex and temporoparietal junction; 2) Conservatism - dorsolateral prefrontal cortex; and 3) Radicalism – ventral striatum and posterior cingulate. The structures Zamboni et al., identify are known to be important in self-other processing, social decision-making in ambivalent situations, and rewards prediction.

Dodd et al., (2012) investigated whether individual-level variation in physiological and intentional responses to aversive or pleasant stimuli correlate with political orientation. They find that greater orientation to adverse stimuli is associated with right-of-centre orientation and political self-placement, while greater orientation to pleasant stimuli is associated with left-of-centre orientation and political self-placement.

Physiological Responses and Behavioural Traits

Oxley et al., (2008) examine the correlations between variations in political attitudes and physiological traits (Oxley et al., 2008). The authors find that individuals with lower physical sensitivities to sudden noises or threatening images are more likely to support

²⁵ Multidimensional scaling (MDS) is a means of visualizing the level of similarity of difference cases in a dataset. It refers to a set of related ordination techniques used in information visualization, to display the information in a distance matrix (Zamboni et al., 2009).

policies for foreign aid, immigration, and gun control. By contrast, individuals with higher sensitivities were more likely to favour defence spending, capital punishment, and patriotism. While Oxley's study does not indicate the direction of causation, it does establish that individuals with liberal and conservative orientations are disposed towards different environmental stimuli, and that this disposition is associated with specific political attitudes.

Lastly, Shook and Fazio (2009) used a novel learning game to investigate relationships among political orientation, exploratory behaviour, and attitude formation (Shook and Fazio 2009). During the learning game participants were required to choose between novel stimuli to discover the associated reward valence. The authors find that political orientation correlated with exploration during the game. Specifically, conservative oriented individuals sampled fewer targets than liberal oriented individuals. The authors also find that conservative oriented individuals exhibited a strong learning asymmetry, learning more from negative stimuli than from positive stimuli. The authors argue that differences in learning are due to the extent of exploratory behaviour during the game. In comparison to liberal oriented individuals, conservative oriented individuals pursued a more avoidant strategy to the game, which led to the development of a more pronounced valence asymmetry in learning, meaning that conservative individuals learned more from negative than positive stimuli. The result of Shook and Fazio's study is significant to the GRH and SRH hypotheses. Apart from directly supporting the predictions of the SRH that conservative individuals will display a greater sensitivity to negative stimuli, the sensitivity to negative stimuli itself as a tool for learning may explain why conservative individuals prefer normative and well-structured environments as these conditions may help facilitate environmental learning such as the identification of untrustworthy actors by simplifying the conditions of the surrounding environment (Jost

2009; Jost and Amodio 2012; Jost, Federioci, and Napier 2009; Jost, Nosek, and Gosling 2008).

In summary, recent research suggests that individuals identifying as either liberal or conservative display significant behavioural differences in response to the same environmental conditions. In particular, the evidence suggests that conservative oriented individuals are disposed towards the reception and processing of negative stimuli, including external threats and threatening imagery (Oxley et al., 2008). Conservative oriented individuals display strong preferences for environmental stability and are less likely to engage the cognitive centres responsible for changing habitual behaviours in response to novel stimuli (Amodio 2007; Jost and Amodio 2012). Conservative oriented individuals are also more likely to learn from negative rather than positive experiences during a novel learning task. In comparison, liberal oriented individuals are disposed towards processing internal psychological states, and show increased sensitivity towards pleasant stimuli. Liberal oriented individuals are also more open to new environmental stimuli, and are more likely to change habitual behaviour in response to novel stimuli (Amodio et al., 2007; Shook and Fazio 2009).

Based on the extent of observed behavioural differences, the evidence suggests that the liberal and conservative ideological orientations strongly reflect differences in individual sensitivity and responses to environmental stimuli. However, why these differences exist, and the process(es) that contribute to their formation remains unclear. Given the established hereditary factors associated with differences in ideological orientation, one possible explanation is that these differences may indicate variations in adaptive behavioural responses aimed at addressing different environmental factors. From an evolutionary perspective, these variations in responses to environmental stimuli may

reflect different approaches or “strategies” to maximize individual utility across the whole range of possible social-environmental factors, including social interactions.

Section 4: What are Behavioural Strategies?

The term strategy refers to a plan to achieve a long-term or overall aim through a specific course of action (Oxford). Within the natural sciences, strategies are concepts for the study of behaviour, which attempt to understand the purpose of an expressed trait or behaviour by focusing on the overall utility of that trait or behaviour, and how this result is beneficial to an individual, typically measured as a contribution to fitness (Axelrod 1984; Axelrod and Hamilton 1981; Nowak 2005; Smith 1982a; Smith 1986; Smith and Winterhalder 2009, pg. 34, 54).²⁶ Within the evolutionary sciences the study of behaviours as strategies often involves examining how behaviours, such as dispositions, are beneficial or detrimental under different social or environmental conditions (Hare et al., 2007; Hare and Tamasello 2005). Is a strategy beneficial across a wide set of environmental conditions, or is it beneficial under specific conditions such as stress or draught? Moreover, within the species under study is there more than one strategy present, for example, foraging behaviour, and if so why, what are the advantages and disadvantages (tradeoffs) of each strategy, and under what set of conditions are they advantageous?

Within this research, I focus on how specific subsets of behaviours affect levels of trust and cooperation under different environmental conditions. I study whether the differences in dispositions between individuals on opposite sides of the political spectrum affect their willingness to engage in risky social interactions, under what conditions these

²⁶ The approach of evolutionary game theory is to consider whether a particular behaviour or strategy is stable within the population, e.g. whether a behaviour within a specific population can be invaded or outcompeted by a different strategy (Smith and Winterhalder 2009, pg. 34)

behavioural differences are expressed, and, if expressed, how these dispositions affect behaviour (Carney et al., 2008; Van Vugt 2006). In this context, the term strategy is a conceptual tool used to capture the utility of behaviours for an individual by studying the costs and benefits of a behavioural outcome in response to specific socio-environmental stimuli or conditions (Smith and Winterhalder 2009, pg. 29-32). The characterization of liberal and conservative differences in terms of strategies is therefore useful in developing a working understanding of why individuals with different political orientations also vary in their behaviours and dispositions; for example, whether individuals with different political orientations are employing different strategies towards risk acceptance or aversion (Axelrod 1984; Axelrod and Hamilton 1981; Nowak 2005; Smith 1982a; Smith 1986; Smith and Winterhalder 2009, pg. 34-38). The objective of this approach is to better understand the “ultimate” functional or evolutionary causes of behaviour by studying the “proximate” mechanistic causes contributing to the behavioural differences observed in individuals with liberal and conservative political orientations (Tinbergen 1963).

Recall that the definition of dispositions are *tendencies or states of readiness to act in a specific way in response to specific types of environmental stimuli*, which implies that under similar environmental conditions individuals with different dispositions are disposed to act in different ways (Gazzaniga 2012, pg. 40-41). For example, in the exploratory learning experiment conducted by Shook and Fazio (2009), conservative oriented individuals applied a more focused learning strategy, while liberal oriented individuals adopted a wider learning strategy. From an evolutionary perspective, the presence of two clearly different behavioural approaches suggests that liberal and conservative groups may be employing different strategies to maximize their utility under two or more different environments conditions (Axelrod 1984; Axelrod and Hamilton 1981; Nowak 2005; Nowak 2006; Trivers 1985). Assuming a hereditary influence, the presence of two different approaches also implies that these approaches vary in how they contribute to

individual utility in specific contexts, and that across the range of successive environmental conditions both strategies are successful (Axelrod 1984; Axelrod and Hamilton 1981; Nowak 2005; Nowak 2006). Consider, for example, how liberal and conservative strategies may equate to different utilities during Shook and Fazio's exploratory game.

Shook and Fazio's game consisted of multiple rounds of play. In each round participants were presented with a number of geometric objects, "beans", and were asked to select one bean per round. The beans presented in each round reflected a sample-set of the overall number of beans present in the experiment; in each round a participant would view a new sample-set taken from the overall population of beans and then select one as their outcome. Assigned to each type of bean was a specific utility, which was consistent across all rounds of play. This utility translated into the reward participants earned during the experiment. In each round, the utility of each bean was hidden from participants until this bean was selected. The utilities assigned to each bean varied in their size, 1-10, and degree, positive or negative value. Subsequently, participants earned payoffs by selecting beans, and selecting certain types of beans resulted in better payoffs than others. The total payoff was accumulated across multiple rounds of play.

During the game, conservative oriented individuals employed a risk-averse strategy, selecting only a small sub-set of the total number of beans presented in the exploratory game. Across rounds of play, conservative oriented individuals tended to restrict their selections to beans they previously sampled. By comparison, liberal oriented individuals sampled a much wider range of objects during the game. In each round of play, liberal oriented individuals were more likely to select a bean they had not previously sampled. Overall, by sampling a smaller range of objects conservative oriented individuals exposed themselves to much less risk than liberal oriented individuals; however, in doing so they also learned less about the position of specific beans within the overall game

environment. As an additional result of their selection strategy conservative oriented individuals were also much more likely to learn from negative beans than from positive ones. In comparison, by sampling a larger range, liberal oriented individuals exposed themselves to more risk, but in doing so they learned more about the range of positive and negative outcomes available to them within the environment. Important for understanding the significance of this experimental outcome and for the argument put forward in this thesis is that neither liberal nor conservative oriented individuals earned a higher overall payoff.

Viewed from an evolutionary perspective each of these behavioural strategies can be potentially beneficial or detrimental depending on the environmental conditions. In a situation where the payoffs associated with playing a restricted set of outcomes are high relative to the costs, then a risk-averse strategy like the one employed by conservative oriented participants, may be advantageous for individuals (Axelrod and Hamilton 1981; Nowak 2005). For example, a foraging strategy which looks for food in the same places each day avoids the potentially high costs associated with exploring new terrain and not finding food. Alternatively, if the payoffs associated with employing a risk-averse strategy are low, for example, foraging in the same place each day results in you finding very little food, then adopting a risk-accepting strategy, such as looking for food in new places, may be advantageous for individuals (Pyke 1984). In both cases individuals are attempting to maximize their returns, but are attempting to do so by applying different behavioural sets within their surrounding circumstances.

To reiterate, the argument being made in this research is that 1) liberal and conservative individuals have different dispositions which cause them to act in different ways in response to the same environmental situation or stimuli, and 2) that these dispositions reflect different approaches to maximizing individual utility in response to a range of different environmental conditions (Amodio 2011; Carney 2008; Gerber 2010;

Schreiber 2013). Within this argument the presence of multiple strategies implies that, while specific strategies may do better in response to specific conditions, across the range of environmental conditions no single strategy or set of strategies is outperforming another (Axelrod 1984; Axelrod and Hamilton 1981; Nowak 2005; Nowak and Sigmund 2006; Smith and Winterhalder 2009, pg. 34-38). This argument further assumes that, due to physiological restrictions, such as the thresholds at which they switch or shift, strategies are different and individuals may not always have the option to switch their strategies. For example, the study by Amodio et al., (2007) demonstrated the right-conservative individuals were much less likely to suppress their habitual response to a stimulus, which correlated with lower activation in the ACC, and greater activation in the amygdala. Even while recognizing that the go no-go task required behavioural flexibility, right-conservative individuals continued to express the same kinds of behavioural outcomes.

Environmental Risk Factors and Alternative Behavioural Strategies

One way to understand the applicability of behavioural strategies to the study of social behaviours, including politics, is through the study of environmental risk factors. Environmental risk factors are an important concept in psychology, particularly in the study of human addiction. Environmental risk factors are characteristics within an individual's environment that increase their likelihood of behaving in specific ways; for example, the number of close friends a person has or the number of environmental stresses they are exposed to are important influences on their behaviour (Caspi et al., 2003). Recently, the study of environmental risk factors is becoming increasingly linked to research on genetics, and the interaction effects between genetic variation and individuals' environmental experiences.

In 2003, Caspi et al., published one of the first studies to examine how genetic and environmental factors interact to influence the onset of depression. Using a longitudinal design, Caspi et al., investigated why stressful events lead to depression in some individuals, but not others. To answer this question, Caspi et al., investigated whether the onset of depressive symptoms was linked to differences in the functional polymorphism in the promoter regions of the serotonin transporter (5-HTT) gene.²⁷ Specifically, whether individuals with one or two copies of the shorter 5-HTT gene were more likely to develop depressive symptoms based on certain environmental conditions. They find that, in the absence of stressful life events, no differences emerged in the onset of depressive symptoms in individuals with either of the short or long genes. However, when stressful life events were taken into consideration significant differences emerged between gene variants. Among participants who experienced stressful life events, participants who had one or more copies of the short 5-HTT gene were significantly more likely to express symptoms of depression than participants who were heterozygotic, or held two versions of the long gene. The results of Caspi et al., were among the first to demonstrate the importance of genetic environmental interaction for the expression of behaviour by showing how specific genes can exacerbate or buffer individual sensitivity to external environmental factors.

This is, however, not the end of the story. In a series of follow-up studies, Taylor et al., 2006 considered the relationship between the short allele, the likelihood of depression, and the effects of positive/supportive life experiences. They find that, among individuals who had strongly supportive life experiences, such as strong maternal relationships,

²⁷ Serotonin is a monoamine neurotransmitter, which is linked to feelings of happiness and well-being. Serotonin transporters function to remove serotonin from the synaptic cleft, terminating its function and allowing for its reuse. The 5-HTT gene, the gene responsible for the producing the serotonin transporters has two common variations (polymorphisms), a long version and a short version. These versions of the 5-HTT genes vary in the levels of serotonin transporters they produce; this variation means that some individuals are more efficient in removing serotonin from the synaptic cleft. This difference in exposure to serotonin results in differences in individual socio-environmental sensitivities (Hariri et al., 2002).

individuals who are heterozygotes for the short gene were significantly less likely to display depressive symptoms than individuals who have one or two copies of the long gene (Taylor et al., 2006).

From an evolutionary perspective this is an extremely interesting result as it suggests that variation on this particular genotype might have specific consequences for individual fitness. When environmental conditions were good, individuals with the short gene fared much better emotionally than individuals with the long gene, and when environmental conditions were bad these effects were reversed. The studies by Caspi et al., and Taylor et al., also demonstrated that, overall, individuals who had two copies of the short gene are much more likely to express depressive symptoms in one context, and much less likely to express depressive symptoms in another (Caspi et al., 2003; Taylor et al., 2006). Comparatively, individuals with the long gene displayed consistent levels of emotional well-being across supportive and stressful environmental conditions. In strategic terms, individuals with two versions of the long 5-HTT gene were displaying a risk-averse strategy, which buffered against uncertainties in environmental conditions. Individuals with two versions of the short 5-HTT gene displayed a risk-acceptant strategy which capitalizes on positive environmental conditions, but which struggles when environmental conditions were suboptimal. In the absence of environmental considerations, neither short nor long versions of the gene showed an increased likelihood of resulting in depressive symptoms. From a strategic perspective neither strategy for well-being can be viewed as more successful than another.

An example more relevant for political science is the potential interaction between dopamine receptors, friendship, and political ideology. In 2010, Settle et al., used the National Longitudinal Study of Adolescent Health to test whether there is an association between self-reported political ideology, a variant of the dopamine receptor gene DRD4

called 7R, and the number of friendships an individual had during adolescence (Settle et al., 2010)²⁸. Previous studies find an association between the 7R variant and novelty seeking behaviour (openness to experience), a personality characteristic associated with liberal political identity. The authors find that among individuals with the DRD4-7R allele the number of friendships a person has during adolescence is significantly associated with liberal political orientation. However, among those who do not have the 7R allele, there is no association between number of friendships and political orientation. This empirical observation is important to the understanding the causal process contributing to liberal and conservative differences as it implies that at least some proportion of these differences are product of genetic environmental interaction, that certain individuals may develop more liberal political preferences in environments with a high number of engaging social agents (Settle et al., 2010). While no studies demonstrate that individuals with this specific genetic variant have an advantage in highly social environments over individuals who lack this variant, it is possible that this variation in behaviour is reflective of an evolved behavioural strategy towards social interaction in large or complex social groups. This possibility assumes that, historically, the social attitudes and behaviours associated with a liberal political orientation, and the specific gene variant that contributes to their expression, are advantageous within an environment with a large number of relevant social agents.

These examples illustrate that, in light of hereditary influences and physiological connections to liberal-conservative ideological orientation, these differences may reflect variation in the evolved sensitivities or responses to various types of environmental stimuli, the function of which is to contribute to individual fitness and utility within

²⁸ Dopamine is a neurotransmitter within the body and the brain. While the brain contains several dopamine systems, one of these systems is important for reward-motivated behaviour. Most types of reward affect the level of dopamine within the brain. Many addictive substances also elicit changes to the levels of dopamine.

different social environmental contexts (Taylor 1992; Van Vugt and Van Lange 2006).

The potential for interactions between genes, environment, and behaviour is an important observation as it may partially explain why traditional social science approaches struggle to explain the causes of variation in individuals' political behaviour (Alford et al., 2005; Hatemi and McDermott 2011, pg. 13-17). While an examination of these interactions is outside the scope of this research project, it remains an important for the understanding of behaviour and behavioural variation within this project, as well as for future studies in political science.

To evaluate whether liberal and conservative political differences reflect alternative strategies I examine the utility associated with differences in their behavioural outcomes during a risky social interaction: a trust or cooperative game (Loberbaum, 1994; Boyd et al., 2003; Takewaza and Price 2010). This research project makes no attempt to directly establish the physical mechanism or process that links sensitivity to specific environmental stimuli to the development of specific political attitudes or behaviours. Rather, this research focuses on the behavioural outcomes of individuals identifying as liberal and conservative, and how these outcomes may contribute to individual fitness across successive generations (Burnham and Johnson 2005).

Section 5: Theoretical Framework: Liberal-Conservative Differences as Alternative Strategies

In light of the differences in behaviours associated with individuals on opposite sides of the political spectrum, this project investigates whether liberal and conservative political orientations are the result of alternative behavioural strategies to maximize returns from social interactions. I develop two alternative evolutionary hypotheses to account for

the behavioural differences underlying the liberal and conservative orientations, the Group Reciprocity Hypothesis (GRH) and the Social Risk Hypothesis (SRH).

Both the GRH and SRH draw upon the theory of motivated social cognition developed by John Jost, and Robert Trivers' theories of reciprocal altruism and indirect reciprocity from evolutionary biology (Jost 2006, Jost and Amodio 2012; Trivers 1971; Trivers 1985). Within the GRH, liberal and conservative differences are viewed as alternative adaptive strategies that attempt to maximize returns from social interactions by increasing the absolute level of reciprocity between individuals. The term 'absolute level of reciprocity' refers to the extent to which individuals reciprocate with partners – ranging from altruistic to unfair reciprocation – as well as the frequency with which individuals engage in social interactions with individuals or the social group (Van Vugt and Van Lange 2006).

Alternatively, in the SRH political differences are not seen as strategies to increase the absolute levels of reciprocity between individuals, but as alternative strategies to avoid the risks of social interaction, such as the costs of exploitation. In addition to the theories of motivated social cognition, reciprocal altruism and indirect reciprocity, the SRH is strongly informed by research into the cognitive and physiological differences associated with liberal and conservative orientations. Below, I review the research necessary to understanding the evolutionary approach before fully developing the GRH and SRH frameworks.

Framing the Evolutionary Approach

As noted, previous studies in the natural sciences and psychology have identified a number of *genetic, physiological, and behavioural* similarities in individuals who share political orientation; including, but not limited to, variations in learning behaviour, personality traits, and cognitive behaviour (Amodio et al., 2011; Dodd et al., 2012; Gerber et al., 2010; Hatemi et al., 2010; Hatemi et al., 2011, Jost 2003; Jost 2009; Schrieber et al., 2013; Shook and Fazio 2009). These studies find that, in comparison to liberal oriented individuals, conservative oriented individuals maintain more closed (often kin-oriented) social groups and have stronger preferences for social rituals, hierarchies, and normative structures; including maintaining traditional moral values, as well as an intolerance of ambiguity and complexity (Fincher 2008; Jost 2006; Schaller and Murray 2008; Thiessen and Gregg 1980; Tuschman 2013). They are more sensitive to negative stimuli, and are less likely to change their habitual responses under novel conditions. Conservative oriented individuals are also more likely to express “Conscientiousness,” a heritable personality trait for the concern about correct behaviour (Gerber et al., 2010).²⁹ Together, these traits suggest that conservative individuals prefer a more stable or more homogeneous social environment (Jost 2009).

In comparison, liberal oriented individuals have greater tendencies towards creative and disorganized behaviours, and are more tolerant of ambiguity and complexity. Liberal oriented individuals are more sensitive to pleasant stimuli, and are more likely to change their habitual responses under novel conditions. Liberal oriented individuals are also more likely to express “Openness to Experience,” an inherited personality trait for novel

²⁹ Subjects with right-conservative political orientations prefer in-group environments with clearly defined and upheld normative structures. The norms themselves, such as religious beliefs or traditional values, vary between groups but the tendency to prefer normative stability and adherence is consistent across subjects who identify with a right-conservative political orientation. Research demonstrates that right-conservative individuals are also intolerant of ambiguity or complexity, preferring both ideas and norms to be clearly defined and demarcated (Jost and Amodio 2012; Jost, Nosek, Gosling 2008; Jost 2009).

sensation seeking (Amodio et al., 2011; Carney et al., 2008; Jost 2006; Schrieber et al., 2011). Together, these traits suggest that liberal oriented individuals prefer a richer, interactive, and less structured social environment.

A meta-study conducted by John Jost reviewing 88 publications from over 12 countries concluded that differences in political orientation are related to two key factors: 1) tolerance of social change, and 2) intolerance of inequality (Jost et al., 2003). According to Jost's model, liberal oriented subjects are more tolerant of changes to existing social structures, but are less tolerant of social inequality. In comparison, conservative oriented subjects are less tolerant of changes to existing social structures, but are more tolerant of social inequality, including conditions of social dominance of hierarchy (Jost et al., 2003; Jost 2006. Jost 2009). Consistent with Jost's findings, a series of separate gene studies find that many socio-political attitudes associated with social changes and inequality—for example, attitudes on gay marriage, foreign aid, or spending on social welfare – are strongly influenced by heredity over and above environmental factors (Alford et al., 2005; Alford et al., 2008; Hatemi et al., 2008; Hatemi et al., 2011; Hatemi et al., 2012). Together, the combination of behavioural dispositions, heredity, and physiological factors strongly suggest that the liberal and conservative political dimension has been shaped by evolutionary influences (Barkow 2005).

Adopting a Social Utility Approach

Drawing on evolutionary studies of behaviour, one possible explanation for the existence of heritable differences is that liberal and conservative oriented individuals are applying alternative behavioural strategies. As reviewed in this chapter, studies from psychology and neuroscience find differences in the cognitive dispositions of individuals

identifying as liberal and conservative in response to environmental stimuli (Amodio et al., 2011; Schrieber et al., 2013; Shook and Fazio 2009) Similarly, heritability studies also link liberal and conservative ideological orientations with a number of genes important for environmental experience, including memory function, synaptic plasticity, and social learning (Hatemi et al., 2011). Together, these environmental sensitivities may cause individuals to develop their specific political preferences for, or attenuate with, certain political attitudes, behaviours, or social structures over others, resulting in the social characteristics that define political orientation (Carney et al., 2008; Funk et al., 2010; Settle et al., 2010). For example, Oxley et al., (2008) find correlations between support of defence spending, capital punishment, and patriotism and higher sensitivities to sudden noises or threatening images. Conversely, lower sensitivities to these stimuli correlate with support for foreign aid, immigration, and gun control (Oxley et al., 2008).

While the evolutionary sciences have a number of theories which can already account for *some* of the behavioural differences (e.g. in-group preferences) associated with having a liberal or conservative orientation, such as a reduction in problems of genetic recombination during reproduction and pathogen avoidance, this thesis explores whether political differences have specific utility for the social environment (Bittles 2004; Fincher et al., 2008; Schaller and Murray 2008; Tuschman 2013, pg. 147-193). The decision to focus on social interactions is based three considerations. First, studies on the development of primate cognition suggest that social factors such as labile social interactions exerted “key selection pressures” on the evolution of human and other primate cognitive capacities (Bryne and Whiten 1992; Bryne and Whiten 1997). Second, research on interactive social behaviour across the disciplines of ecology, economics, evolutionary psychology, social psychology and sociology, suggests that the behavioural differences associated with liberal and conservative orientations have direct implications for how individuals respond to, and

interact with, social environmental stimuli (Amodio et al., 2007; Anderson, Mellor, Milyo 2005; Anderson, Mellor, Milyo 2008; Anderson, Mellor, Milyo 2010; Carney et al., 2008; Schrieber et al., 2013; Sosis and Bressler 2003; Sosis and Ruffle 2004; Taylor et al., 2006; Taylor 1992; West et al., 2006; Yamgishi and Mifune 2008). Third, understanding whether the differences that drive political disputes contain or maintain an element of evolutionary utility in a contemporary environment, as opposed being byproducts of adaptations to other social-environmental conditions, is significant to understanding how these characteristic mechanisms may be related to the “ultimate” causes of political differences. Insofar as political biology is interested in understanding the “ultimate” functional and evolutionary causes of political differences, it is necessary to evaluate all theoretically promising causes of behaviour.

Below, I outline the two competing frameworks to account for the behavioural differences associated with liberal and conservative ideological orientations, which are tested in this research. Beginning with the GRH, I use relevant behavioural research to justify how each theory provides a plausible explanation for the adaptive significance underlying political differences. I also briefly outline the behavioural outcomes expected within each framework. A full list of expected outcomes for each hypothesis, and in each of the three experiments, is provided in Section 6.

Group Reciprocity Hypothesis

The GRH hypothesizes that the behavioural differences underlying liberal and conservative orientations are a result of alternative adaptive strategies that aim to maximize returns from social interactions by increasing the absolute level of reciprocity between individuals. The term ‘absolute level of reciprocity’ refers to the extent to which

individuals reciprocate with the partners –ranging from altruistic to unfair reciprocation – as well as the frequency with which individuals participate in cooperative behaviours with individuals or the social group. Underlying this hypothesis is the assumption that individuals wish to receive the benefits of social interactions, but are fearful of the costs of exploitation, which can be extremely damaging to individual fitness (Nowak 2006; Nowak and Sigmund 2005; Takezawa and Price 2010). The result is a paradox in which individuals must weight the costs and benefits of participating in social interaction, such as risking the costs of exploitation for a chance to benefit from cooperative actions. To overcome this adaptive problem researchers in the evolutionary sciences postulate, based on the analysis of the cooperative behaviours of hominid and other social species, that humans will have evolved behavioural strategies to identify themselves or others as trustworthy social partners, ensure reciprocation, or to minimize the risks of exploitation during cooperative behaviours (Fruth and Hohmann 2002; Hare and Tamasello 2005; Mitani and Watts 2001; Sosis and Bressler 2004). These strategies may include dispositions or “preferences” for the structure and function of a social group (Hare and Tamasello 2005; Jost 2009; Peterson 2009; Van Vugt and Van Lange 2006).

Within the GRH, conservative individuals are seen as employing a social strategy that attempts to encourage and enforce reciprocation through the promotion of social norms and shared identity. Here, the strict adherence to existing norms and structures may benefit individuals through social reputation, which signals their trustworthiness to potential social partners while simultaneously identifying potential social violators (De Cremer and Van Vugt 1999; Van Vugt Van Lange 2006).

The strategy of liberal individuals avoids the high costs of maintaining a social reputation and attempts to directly communicate their desire to engage in reciprocal interaction with potential social partners (Gintis, Smith, and Bowles 2001; Hare and Tamasello 2005). In structured and hierarchical social environments where access to, or

the distribution of, resources maybe concentrated among a few individuals, attitudes for normative flexibility and egalitarianism may signal an individual's willingness to engage in fair reciprocation. In doing so, liberal individuals may advertise themselves to a range of social partners disadvantaged by the existing social structures (Hardy and Van Vugt 2006).

Empirical Support for the GRH

Experimental studies demonstrate that the presence of shared (or enforced) social norms and daily rituals significantly increase levels of trust and cooperation within social groups independently of political or religious affiliations (Anderson, Mellor, Milyo 2010; De Cremer and Van Vugt 1999; Sosis and Ruffle 2004 pg.34-40). Given the strong preferences among conservative individuals for stable, normative, and kin-oriented environments, as well as strong social rituals and hierarchies, one possible explanation for the observed behaviours of conservative individuals is that these individuals are employing a behavioural strategy that attempts to boost intra-group reciprocity by regulating their group's behaviour and constituency. (Frank 1993; Frank 2003; Bernhard, Fehr, and Fischbacher 2006; Taylor 1982). Preferences for established norms and structures may also signal individuals' trustworthiness to social partners by demonstrating their commitment to established social behaviours (Gintis, Smith, Bowles 2001). Conservative individuals are more likely to express the personality trait of 'conscientiousness,' the concern over correct behaviour, suggesting that they have a greater concern for maintaining a strong social reputation.

Additionally, independent studies demonstrate that conservative individuals are more likely to engage in charitable activities than liberal individuals (Brooks 2004). However, many of these activities are often integrated with the activities of social groups,

for example a religious community, suggesting that these behaviours are not entirely altruistic but are linked to a communal good (Anderson, Mellor, and Milyo 2004, 51-53, Anderson, Mellor, and Milyo 2010; West et al, 2006). Previous experimental studies also suggest that conservative individuals are more likely to provide “fair” allocations in trust games than liberal individuals. However, it is unclear whether these “fair” allocations reflect a greater social generosity, or whether these are a product of closed social groups, and the specific norms of reciprocity that would be expected among individuals with preferences towards conscientious behaviour and established social norms and structures (Sosis 2000; Sosis and Bressler 2003; Sosis and Ruffle 2004; Yamagishi and Mifune 2008).

Equally important is that behavioural preferences of liberal individuals have also been linked to levels of social reciprocity. Behavioural economic research on group cooperation finds that the presence of intragroup inequality drastically affects the willingness of individuals to contribute to communal goods. These studies find that group cooperation, measured as the contribution to a communal source of income, declines as the level of inequality between individuals increases (Anderson, Mellor, Milyo 2008). Similarly, studies on cooperation from the biological sciences find that cooperation in humans declines as the level of intragroup competition increases. However, when the competition between groups exceeds competition within the group, levels of intragroup cooperation increase (West et al., 2006). While these findings are not directly linked with political orientation, they suggest that cooperative behaviours involving communal goods in humans may depend on low levels of internal competition, and that norms of fairness and equality may be important to maintaining reciprocity within a social group (Fruth; Hohmann, Gottfried 2002; Hare et al., 2007; Price 2006). Given their strong preferences towards social policies, fairness, and equality, the GRH hypothesizes that liberal

individuals are attempting to increase levels of social interaction by avoiding conditions that contribute to social inequality, such as highly structured and normative environments (Boesch and Boesch-Ackermann 2000).

Theoretical Foundations of the GRH

The GRH account of liberal and conservative differences is informed by two theoretical positions. The first is the theory of “motivated social cognition,” proposed by John Jost, and the second are the theories of “reciprocal altruism,” and “indirect reciprocity” developed by Robert Trivers (Jost et al., 2003; Trivers 1971). The theory of social cognition argues that liberal and conservative political orientations are based on two dimensions of social behaviour: 1) the tolerance of social change, and 2) the tolerance of inequality (Jost and Amodio 2012).³⁰ Where traditional approaches in political science, such as the Michigan school, rational choice theory, or social constructivism, see political orientation as resulting from the effects of socialization or the pursuit of conscious interests, motivated social cognition sees ideological behaviours as being driven by individuals’ cognitive and emotional needs (Carney et al., 2008; Green and Shapiro 1994; Jost 2003). Jost argues that these two psychological dimensions, the tolerance of social change and inequality are part of the human cognitive apparatus.

Adopting a dispositional approach to behaviour and ideological orientation, Jost’s model assumes that “individuals gravitate” towards the ideas and behaviours that “match” or “resonate” with their own psychological needs, or sensitivities (Jost 2009; Jost, Federico, and Napier 2009; Tomkins 1963). Based on this model, Jost hypothesizes that

³⁰ While Jost (2009) sees social change and social equality as the core dimensions of left-liberal and right-conservative ideological, in Jost’s view of these dimensions is inexorable tied with preferences for stability as well as for social dominance or social hierarchy (Jost 2009, pg. 132)

conservative orientations are favoured by individuals possessing strong needs to manage the effects of threat and uncertainty, and to simplify the conditions of their external environment. By comparison, a liberal orientation is favoured by individuals with lower psychological needs to balance the effects of threat or uncertainty, but a greater desire to maintain an egalitarian social environment.

Threat and uncertainty refers to a need to manage two factors; a desire to manage external threats from predation or other social actors, and a desire to minimize one's personal sense of helplessness or existential doubt. Observing that conservative oriented individuals are less tolerant of change and more tolerant of inequality, including social dominance and hierarchy, Jost suggests, "preserving the (in egalitarian) status quo allows one to maintain what is familiar and known while rejecting the risky, uncertain prospect of social change" (Jost, Federico, and Napier 2009, pg. 990). Within the motivated social cognition model, conservative individuals seek to minimize costs of cognitive processing and psychological stress associated with complex environments. Alternatively, liberal orientation is reflective of individuals with lower sensitivity to threat and uncertainty, as well as higher needs for complex cognition, imaginative thinking, and a sensitivity to inequality (Jost and Amodio 2012).

While Jost's hypothesis is consistent with research findings in social psychology, the argument that conservative political orientations emerged as a result of psychological motivations to reduce feelings of threat and uncertainty is incomplete. Missing from his position is a mechanism to explain why subjects are interested in simplifying their environment beyond a purely psychological need, and why the two dimensions of social behaviour he identifies, the tolerance and intolerance of social change, and of inequality, are important to this process. Furthermore, the motivated social cognition model also fails to offer a full account for the existence of liberal identities; such as why individuals should develop a psychological need for egalitarian social environments. Equally problematic is

that, from an evolutionary perspective, Jost fails to provide an explanation for why human behaviours should include the two sets of behavioural dispositions (Axelrod 1984; Shovel et al., 2012).

While liberal identities are viewed as a product of a reduced sensitivity to threat, a desire to engage in more sophisticated cognition, and the sensitivity to inequality, the mechanism that drives the psychological need for these behavioural characteristics is never fully developed within the motivated social cognition model. Although research in psychology and social psychology is often assumed to have a biological-evolutionary basis, in this instance little attention is given to unpacking how the behaviours and dispositions associated with conservative and liberal political orientations can be viewed as a natural responses to the conditions of the external environment, such as why these two sets of dispositions exist, and how they benefit individual utility (Van Vugt and Van Lange 2006).

One possible explanation for the evolution of preferences for social environments that are stable and simplified and for those that are normatively flexible and egalitarian is that these conditions contribute to the maintenance or occurrence of altruistic behaviours among social actors (Takezawa and Price 2010; Van Vugt and Van Lange 2006).

Developed by Robert Trivers, the theory of reciprocal altruism is an evolutionary mechanism that attempts to explain the evolution of cooperative behaviours between non-related actors. Trivers defines reciprocal altruism as a behaviour where an individual acts in way that temporarily reduces its own fitness while increasing another individual's fitness, with the expectation that the other individual will reciprocate this gesture at a later time (Trivers 1971). Trivers argues that, when the cost of an "altruistic" action is less than the potential long term benefits from reciprocation, altruistic behaviours will evolve in a

population (Trivers 1971).³¹ The second theoretical component to explain the evolutionary origin of social interactions is the theory of indirect reciprocity. Where reciprocal altruism relies on repeated encounters between the same subjects, indirect reciprocity relies upon the reputations of subjects within social groups to act as cues to trustworthiness (Gintis, Samuels, and Bowles 2001; Nowak and Sigmund 2005; Trivers 1971). Instead of the same two individuals interacting repeatedly, third parties can make inferences about subjects' trustworthiness based on observations of their previous social interactions. This model requires that subjects be able to observe and monitor the changing social network of the group in order to keep track of subjects' reputations (Gintis, Samuels, and Bowles 2001). Studies on social behaviour demonstrate that the ability to track or maintain reputations can have a significant impact on levels of social interaction, both between individuals and within social groups (Boyd et al., 2003; Price 2006; Sosis 2008; Yamagishi, Nobuhito, and Tohko 1999).

Accordingly, Trivers' ideas of reciprocal altruism and indirect reciprocity may explain the evolutionary mechanisms underlying Jost's hypothesis about motivated social cognition. Placed in the evolutionary framework, dispositions towards the tolerance of social change and the tolerance of inequality may reflect adaptive behaviours if these behaviours contribute to individual fitness via the frequency of returns from beneficial social interactions. For example, if preferences for stable, normative, structured, and hierarchical social environments increase beneficial social interactions by; 1) allowing individuals to select on social partners by tracking the behaviours of individuals in a social group, 2) normalizing or coercing reciprocation following a cooperative action, or 3)

³¹ Conditions for Reciprocal Altruism: 1) the behaviour must reduce a donor's fitness relative to a selfish alternative; 2) the fitness of the recipient must be elevated relative to non-recipients; 3) the performance of the behaviour must not depend on the receipt of an immediate benefit; and 4) conditions 1, 2, and 3 must apply to both individuals engaging in reciprocal helping. There are two additional conditions necessary "...for reciprocal altruism to evolve". A mechanism for detecting 'cheaters' must exist, and a large (indefinite) number of opportunities to exchange aid must exist (Stephens 1996, pg. 533-551).

increasing general participation in communal goods, then it is possible that dispositions for these behaviours could evolve within a population (Tooby, Cosmides, and Price 2006; Van Vugt and Van Lange 2006). Similarly, if high levels of inequality are adversely affecting social interactions important to individual fitness, then dispositions for the intolerance of inequality may evolve in a population (Tooby, Cosmides and Price 2003). For example, high levels of inequality are detrimental to individual utility if they cause; 1) individuals to withhold reciprocity, or 2) decreases in contributions to communal goods (Anderson, Mellor, Milyo 2008; West et al., 2006).

Furthermore, highly structured and hierarchical environments may systematically disadvantage lower status individuals by giving high status individuals preferential access to resources. As a result, dispositions to challenge inequality may reflect strategies to avoid exploitation, as well as strategies to signal other potential social partners about an individuals desire to reciprocate fairly (Hare et al., 2007; Tooby, Cosmides, Price 2009; Smith et al., 2016). The assumption here is that individuals may withhold cooperation from high status individuals in highly stratified and unequal social environments (Anderson, Mellor, Milyo 2008; West et al., 2006). Given the connection between hierarchy, social competition, and reduced cooperation it is possible that liberal orientation reflects an evolutionary strategy to manage the effects of inequality and class structure on social reciprocity.

If liberal and conservative orientations are the result of alternative strategies for social interaction, then the GRH expects that levels of trust and participation in social interactions should be sensitive to; 1) conditions of social change and or inequality, and 2) social cues indicating that their preferred social strategy is shared by another social agent (Gintis, Samuels, and Bowles 2001; Van Vugt and Van Lange 2006). Consistent with Jost's theory of motivated cognition, principles from evolutionary psychology maintain that, if subjects seek to regulate the structure or behaviour of their social environment as

part of a social strategy, then individuals should be sensitive to the attitudes or behaviours of their social partners and this sensitivity should be reflected in their willingness to engage in a social interaction (trust) (Frank 2003; Peterson 2009; Van Vugt and Van Lange 2006). Moreover, because these strategies are about ensuring reciprocation, it is expected that subjects will discriminate between partners based on available social cues (Byrne and Whiten 1992; Byrne and Whiten 1997). The GRH maintains that *if implicit attitudes towards social change and for inequality are reflective of alternative evolved social strategies, then the presence of shared attitudes should provide a salient social cue that a potential social partner shares the objective to increase reciprocity and is therefore likely to reciprocate*. The full predictions of the GRH are listed in the experimental section at the end of this chapter.

Social Risk Hypothesis

While both the GRH and SRH begin with the same behavioural assumptions, and build on the theory of motivated social cognition as well as the theories of reciprocal altruism and indirect reciprocity, each theory postulates a different mechanism through which individuals attempt to maximize returns from social interaction. The Social Risk Hypothesis (SRH) hypothesizes that the behavioural differences associated with liberal and conservative orientations are the result of alternative adaptive strategies to minimize the risks of social interaction (Byrne and Whiten 1988; Byrne and Whiten 1992; Tooby, Cosmides, Price 2003). Where the GRH hypothesis sees the behavioural differences associated with liberal and conservative orientation as a result of alternative strategies to increase the absolute level of reciprocity within a social group, the SRH sees these differences as alternative approaches to minimize the costs of exploitation. Within the

SRH model, conservative individuals are viewed to be applying an open cooperative strategy, with conservative individuals being initially more open to trust and participation in social interactions than liberal individuals (Brooks 2004). Unfortunately, this greater willingness to trust and participate makes conservative individuals vulnerable to exploitation (Nowak 2006; Nowak and Sigmund 2005). To avoid the costs of exploitation conservative individuals evolved a greater sensitivity to negative or “threatening” stimuli as a defensive mechanism (Amodio et al., 2007; Kanai et al., 2011; Schreiber et al., 2013). Within the SRH model, conservative individuals develop preferences for stable, normative, and well-structured social environments, as these conditions assist in identifying potential threats by allowing individuals to better monitor the behaviour and reputation of individuals within a group. Stable, normative, and structured environments simplify environments and provide individuals with clear behavioural rules. Within these highly ordered environments, identifying potential social threats is simplified by identifying those who are not following the rules (Gintis, Samuels, and Bowles 2001; Peterson 2009; Van Vugt and Van Lange 2006).

Liberal individuals are applying a strategy of wary cooperation. In comparison to conservative individuals, liberal individuals are initially less willing to participate in social interaction (trust and cooperation) with social partners. This initial reluctance means that liberal individuals avoid the potential costs of exploitation; however, they also risk losing the benefits of social interactions (Van Vugt 2006). To compensate, liberal individuals are more sensitive to social cues indicating a partner’s “trustworthiness”, or willingness reciprocate following interactions (Hare et al., 2007). Within the SRH, the preferences for egalitarian and non-hierarchical social environments displayed by liberal individuals are viewed as the result of a strong underlying concern for fairness, the desire to obtain reciprocity (Gintis, Samuels, and Bowles 2001; Hare et al., 2007).

Empirical Support for the SRH

Studies on the cognitive and psychological differences of liberal and conservative individuals suggest these two groups have very different sensitivities to socio-environmental stimuli (Amodio et al., 2007, Shook and Fazio 2009). Recall that Shook and Fazio find that conservative individuals employ a more focused learning strategy, and that they were more likely to learn from negative stimuli than liberal individuals. Repeated studies on personality traits find that conservative oriented individuals are more likely to express conscientiousness, the concern for correct behaviour, as well as an intolerance of ambiguity and a greater need for cognitive closure. Amodio et al., (2007) find that conservative individuals were more likely to employ a habitual response during a g/no-go task. Oxley et al., demonstrated an association between conservative orientation, such as support for military spending and military intervention, and a greater sensitivity to negative stimuli (Oxley et al., 2008). Schreiber et al., (2013) demonstrated that, during a risky social interaction, conservative individuals are more concerned with external threat, displaying large volume and activity in the right amygdala, the area of the brain associated with negative emotional processing (Kanai et al., 2011; Schreiber et al., 2013). Coupled with the results of previous studies on social cooperation which find that conservative individuals are more likely to make fair or generous allocation during social interaction (Sosis and Ruffle 2004), and the fact that conservative consistently rate themselves as being more trusting in studies such as the ANES (Anderson, Mellor, Milyo 2004), these findings suggest that conservative individuals are not attempting to maximize returns from social interaction by increasing the level of reciprocity between individuals, but are attempting to avoid the risks associated with social interaction, specifically exploitation.

Similarly, behavioural studies also support an alternative explanation for the causes of liberal behavioural dispositions. Amodio et al., find that liberal individuals have a more

flexible cognitive style, and are more likely to change habitual responses during a go/no-go task (Amodio et al., 2007). Oxley et al., demonstrated an association between liberal orientation, such as support for foreign aid, and welfare spending, and a lower sensitivity to negative stimuli (Oxley et al., 2008). Schreiber et al., demonstrated that during a risky social interaction, liberal individuals display a larger volume and activity in the anterior cingulate cortex (Schreiber et al., 2013). As the part of the brain associated with affective decision-making, the left insula cortex is involved in the representation of internal bodily cues for subjective feeling states and emotional regulation related to signaling potential changes in interceptive state. The insula cortex also functions to signal changes in possible decision-related outcomes. This greater level of activity in the insula cortex during risky decision-making suggests that liberal individuals may have a greater potential to update and change their decision-making process after receiving new information.

Comparatively, the greater levels of amygdala activity and lower levels of insula activity observed in conservative individuals suggests that conservative individuals are more focused on threat-related outcomes and maybe more likely to update their decision-making process if primed by a negative stimuli (Schreiber et al., 2013).

Accordingly, the expectation of the SRH is as follows: 1) initial levels of trust among conservative individuals will be higher in comparison to liberal individuals, 2) levels of trust in conservative individuals will be highly sensitive to negative social cues, and 3) willingness to trust among liberal individuals will be sensitive to positive stimuli indicating a social partner's desire to reciprocate fairly following a social interaction.

The full predictions of the GRH and SRH are provided in the experimental section.

The hypothesis that conservative oriented individuals are more likely to trust is somewhat controversial as it appears contrary to previous studies that show correlations between conservative orientation and a greater sensitivity to external threat, or social out-

groups (Duckitt and Fisher 2003; Asbrock, Sibley and Dickitt 2010; Oxley et al., 2009). Based on these alternative findings the expectation might be that conservative oriented individuals should show lower levels of trust when matched with an anonymous partner. Worth noting is that, while the study of cooperative behaviour by Sosis and Ruffle (2004) does find that conservatives are more generous during social interaction, this finding is not replicated in a study by Anderson, Mellor, and Milyo (2004) who find no significant difference in levels of trust and cooperation in liberal and conservative oriented individuals. While the study by Anderson et al., suffers from several methodological limitations including small sample size, and priming effects, the contradictory expectations for conservative behaviour requires that an additional level of scrutiny be given to the experimental results as they relate to this hypothesis.

Section 6: Experimental Setup

To unpack the adaptive significance of liberal and conservative political orientations this project utilizes a multi experimental design consisting of three experiments. The purpose of these experiments is to understand how dispositions associated with liberal and conservative orientations express themselves and affect behaviour under different environmental contexts. By viewing behaviour under different contexts these experiments aim to identity the utility, potential risks and benefits of liberal and conservative behavioural differences during social interaction (Toby, Cosmide, Price 2003; Van Vugt and Van Lange 2006). These behavioural differences are then compared against the expected outcomes of the GRH and SRH.

To capture this behavioural utility the experiments focus on observing the responses of liberal and conservative oriented individuals to environmental conditions that are reflective of the socio-political attitudes, in this case conditions of social change and

inequality. Of particular interest is whether liberal and conservative oriented individuals show differences in their responsiveness to these conditions during a social interaction involving trust or cooperation. A central question asked by this thesis is whether implicit attitudes for social change and inequality are best understood within the framework of the GRH, as reflecting alternative strategies to increase the absolute level of reciprocity between individuals within a social group, or within the SRH, as a by-product of adaptive dispositions to minimize the risks of social interactions.

Experiment One

In Experiment 1, I utilize a trust game with a between subject design and test how implicit social attitudes related to the tolerance-intolerance of social change and for inequality affect the willingness of liberal and conservative individuals to trust an anonymous partner during a risky social interaction. This experiment is based on a previous design by McCabe, Rigdon, and Smith (2003). The objective of this experiment is to evaluate the initial feasibility of GRH and SRH. I test the assumption of the GRH that implicit attitudes for social change and for inequality are a result of strategies that attempt to maximize returns from social interaction by increasing the absolute level of reciprocity between individuals. To this test assumption I examine whether implicit attitudes for social change and inequality function as social cues that increase trust between social actors, resulting in higher levels of interaction (Gintis, Smith, and Bowles 2001; Peterson 2009; Smith et al., 2011; Van Vugt and Van Lange 2006). In this experiment participants are matched randomly with another study participant and are asked to take part in a risky social interaction, an economic game. Across multiple treatments, participants are provided with different information about their partner's social attitudes; either their, 1)

implicit attitudes for social change and inequality, 2) political orientation, 3) shared sports preference, or 4) no information (Control) (Smith et al., 2011). Based on their ideological orientation the information participants receive will either be similar or dissimilar to their own attitudes. After receiving the information participants are asked to take part in an economic game with their partner. The economic game employs a dichotomous outcome in which Player 1 can choose to opt-out of the interaction for a small reward, \$8 split between themselves and their partner (\$4-\$4), or they can opt-in to the interaction for a chance at a larger payout (\$12). The catch is that while the decision to play the game is made by Player 1, the allocation of the larger payout (\$12) is decided by Player 2, who can choose between either fair (\$6-\$6) or unfair (\$2-\$10) allocation. Participating in the interaction therefore constitutes a risky decision by Player 1. Experiment 1 therefore measures the effect of social information on the willingness of Player 1 to trust Player 2 by deciding to play the economic game (McCabe, Rigdon, and Smith 2003).

Experiment 1 makes an important contribution to the overall thesis by evaluating the utility of implicit attitudes for levels of social interaction in comparison to other signals of shared social identity (Peterson 2009). This evaluation is important for determining whether implicit attitudes are themselves adaptive behaviours for social interaction as predicted by the GRH, or whether implicit attitudes are better explained by the SRH, as a by-product of an adaptive strategy to avoid the costs of exploitation during social interactions. Observing that trust in both liberals and conservatives is positively affected by shared implicit social attitudes would support the expectations of GRH. However, observing that a positive affect is limited to liberal participants, and a negative affect is observed in conservative participants would support the expectations of the SRH. To rule out the possibility that the observed outcomes are a consequence of shared social identity, participants are also matched with individuals who have similar and dissimilar political orientations and sports preferences. If implicit attitudes are a salient cue of trustworthiness,

as argued by the GRH, then the effect of these attitudes on trust should be greater than, or equal to, a strong cue of shared social identity such as shared political orientation. Below I list the expected outcomes from both the GRH and SRH. A more detailed account of the experiment and the expected outcomes is provided in Chapter 3, in which I present the full results of Experiment 1.

Group Reciprocity Hypothesis (GRH)

Hypothesis A1:

- Compared to Control conditions, liberal oriented individuals will display increased levels of trust in response to social values favouring normatively flexible and egalitarian social environments. Compared to Control conditions, conservative oriented individuals will display increased levels of trust in response to social values favouring normatively stable, well-structured, and hierarchical social environments.

Hypothesis A2:

- In both liberal and conservative oriented individuals the effect of knowledge of “shared” social values on levels of trust will be greater than the effects of knowledge of a shared “minimal” social identity, a shared preference for a favourite sport.

Hypothesis A3:

- In liberal and conservative oriented individuals the effects of “shared” political orientation on trust will be less than, or equal to, the effects of each group’s associated implicit attitudes.

Social Risk Hypotheses (SRH)

Hypothesis B1:

- Under the Control, no information condition, conservative oriented individuals will be more likely to trust than liberals.

Hypothesis B2

- Compared to Control, conservative oriented individuals will display decreased levels of trust in response to social values for normatively flexible and egalitarian social environments.

Hypothesis B3:

- Compared to Control, trust in liberal, but not conservative oriented individuals will be increased in response to shared implicit attitudes.

Hypothesis B4:

- Trust in liberal, as compared to conservative oriented individuals, will be significantly higher in response to implicit attitudes for normatively flexibility and egalitarian social environments.

Experiment Two

In Experiment 2, I utilize a communal goods game with a between subject design and test the effect of social fairness and inequality on levels of group cooperation. This experiment is based on a modified version of an experiment conducted by Anderson, Mellor and Milyo (2008). In this experiment I directly manipulate the payout structure to induce an inequality between players. Players are randomly assigned to groups in which members receive equal, or high and low payoffs and are able to observe the payouts of other group members (Anderson, Mellor, Milyo 2008). Payouts are awarded for each token participants their earn during the communal goods. This structure is adopted so that the inequality between players is independent of the number of tokens obtained during the communal goods game (i.e. not a direct function of their participation in the communal goods). To separate the effect of social inequality from social fairness I include an experimental treatment in which the participants with the higher payout are given the option to redistribute the payments so that each player receives an equal payout per token.

This experiment has four objectives: 1) to evaluate the effect of inequality on contributions to a communal goods, 2) to evaluate whether inequality has a disproportionately effect in liberals or conservatives, 3) to separate the effect of general inequality from individuals' perceptions of social fairness, 4) to evaluate whether the behavioural responses of liberals and conservatives to inequality are consistent with the predictions of the GRH or SRH for alternative behavioural strategies (Peterson 2009; Sosis 2000; Van Vugt and Lange 2006).

By investigating the effect of inequality, and of inequality as a function of fairness, I am able to disentangle assumptions of the GRH and SRH regarding the adaptive significance of attitudes towards inequality (Jost and Amodio 2012; Jost, Federico, and Napier 2009). If the GRH model is correct, then individuals should be generally sensitive

to the presence of inequality within a social group and should consequently show reduced contributions to the communal goods. Alternatively, if the SRH is correct, then individuals should not show sensitivity to a general inequality, but should be sensitive to an inequality that is directly the result of the behaviours of another social agent. Below, I list the expected outcomes for the GRH and SRH. A more detailed account of the experiment and the expected outcomes is provided in Chapter 4, in which I present the full results of Experiment 2.

Group Reciprocity Hypothesis (GRH)

Hypothesis A1:

- ☐ Compared with control conditions, liberal oriented participants will display lower levels of cooperation in social groups in which there is a general inequality.

Hypothesis A2:

- ☐ Compared to conservative oriented participants, liberal oriented participants will be more likely to vote in favour of redistributing resources to remove a general inequality.

Social Risk Hypothesis (SRH)

Hypothesis B1:

- ☐ Compared with control conditions, cooperation in liberal oriented participants will not be negatively affected by a general inequality.

Hypothesis B2:

- ☐ In response to a positive social cue, the decision of other group members to redistribute the payments equally, cooperation in liberal oriented participants will be high in comparison to conservative oriented participants.

Hypothesis B3:

- ☐ Compared with control conditions, cooperation in liberal oriented participants will be positively affected by a positive social cue, the decision of other group members to redistribute the payments equally.

Hypothesis B4:

- ☐ Compared with control conditions, cooperation in conservative oriented participants will be negatively affected by a negative social cue, the decision of other group members not to redistribute the payments equally.

Experiment Three

In Experiment 3, I utilize a communal goods game with a between subject design and test the effect of normative agreement and disagreement on levels of cooperation (Gintis; Smith, and Bowles 2001; Peterson 2009; Price 2006; Van Vugt 2006). Agreement and disagreement about a social norm is used as proxy for social change. Using a multiple treatment design, participants are assigned to groups in which the majority of participants either share or do not share their opinion about: 1) the relative importance of two social norms, or 2) the existence of a normative violation in a moral scenario.

Once assigned to a group participants are informed about the attitudes of their group members and are asked to participate in the communal goods game. This structure is adopted to separate and compare the effects of disagreement about social norms to the effects of perceived normative violations on levels of social cooperation.

This experiment has three objectives: 1) to observe whether liberal and conservative oriented individuals respond differently to conditions of social disagreement; 2) to observe whether any differences in response to Treatment approximate those of Experiments 1 & 2; and 2) to investigate the hypothesis of the GRH and SRH concerning the adaptive utility of attitudes towards social change, structure, and stability (Peterson 2009; Smith et al., 2011).

Experiment 3 makes an important contribution to the overall thesis by evaluating the effects of social change on levels of group cooperation. By comparing the effects of disagreement about the importance of a social norm from the effects of disagreement about a social violation I am able to approximate the effect a changing social environment may have on levels of cooperation (Bernhard, Fehr, Fischbacher 2006; Sossis 2000; Sossis and Bressler 2003; Sossis and Ruffle 2004). In doing so I am able to evaluate the competing assumptions of the GRH and SRH; that normatively stable social environments result in

higher levels of social cooperation, or that conservative individuals will show lower levels of trust and cooperation following exposure to a negative stimuli. Below I list the expected outcomes for the GRH and SRH. A more detailed account of the experiment and the expected outcomes is provided in Chapter 5, in which I present the full results of Experiment 3.

Group Reciprocity Hypothesis (GRH)

Hypothesis A1:

- Conservative oriented participants will display higher levels of cooperation in social groups with which they share a strong normative position, as compared to groups in which they share a “minimal” identity.

Hypothesis A2:

- Conservative oriented participants will display lower levels of cooperation in social groups in which the majority of participants approve of a perceived normative violation in comparison to groups in which the majority does not approve of a normative violation.

Hypothesis A3:

- Compared to liberal oriented participants, conservative oriented participants will display higher levels of cooperation in social groups with which they share a strong normative position, as compared to groups with which they share a “minimal” social identity.

Social Risk Hypothesis (SRH)

Hypothesis B1

- Conservative oriented participants will *not* display higher levels of cooperation in social groups with which they share a strong normative position, as compared to groups with which they share a “minimal” social identity.

Hypothesis B2:

- Conservative oriented participants will display lower levels of cooperation in social groups in which the majority of participants approve of a perceived normative violation, compared to groups in which the majority of participants do not approve of a normative violation, and in response to shared “minimal” group identity.

Hypothesis B3

- Cooperation in liberal participants should not be significantly different between conditions in which they agree or disagree with group members about a minimal social identity.

Collectively, there are two important differences between the predictions of the GRH and SRH. First, in experiment 1 the SRH expects that liberal individuals will display lower levels of trust in the control treatment as compared to conservative individuals. Second,

the SRH expects that trust and cooperation in conservative individuals will not be positively affected by positive social cues such as shared implicit attitudes, the redistribution of participant payments, and shared perspective about a normative violation, but will be negatively affected by unshared attitudes, the continuation of inequality, and unshared normative perspectives. This second point marks where the predictions of the SRH significantly deviate from those of the GRH, reflecting the positions that the implicit social attitudes of conservative individuals are a by-product of an adaptive strategy to manage external risk, and are not themselves an explicit component of an adaptive strategy to increase reciprocity within a group (Amodio et al., 2007; Kanai et al., 2011; Schreiber et al., 2013).

Summary

In this chapter I outline the approach and theoretical foundation used to investigate the adaptive significance of behavioural differences associated with liberal and conservative ideological orientations. I outline the theoretical proposition that the behavioural differences associated with liberal and conservative orientations are a result of alternative adaptive strategies to maximize returns from social interaction. I also establish the dispositional approach employed in this research, which aims to study the adaptive significance of liberal and conservative orientation by examining behavioural differences associated with each orientation in response to different environmental stimuli. Here, I focus on manipulating dispositions linked to individuals' attitudes towards social change and for inequality. After outlining this approach, I presented two competing frameworks to account for the adaptive significance of these behavioural differences, the Group Reciprocity Hypothesis (GRH) and the Social Risk Hypothesis (SRH). Relying on the

theory of motivated social cognition and the theories of reciprocal altruism and indirect reciprocity, each of these frameworks interprets the social utility behind the behavioural difference associated with liberal and conservative orientations. Under the GRH, the behavioural differences associated with liberal and conservative ideological orientations are viewed as a result of alternative adaptive strategies to maximize social returns by increasing the absolute levels of reciprocity between individuals. Under the SRH, the behavioural differences associated liberal and conservative ideological orientations are viewed as a result of alternative strategies to avoid the costs of exploitation during social interactions. Finally, I concluded this chapter by presenting the three experimental frameworks used to evaluate the predictions of the GRH and SRH on the adaptive significance of behavioural differences associated with liberal and conservative orientations.

Chapter Three: Experiment One

Implicit Attitudes as Social Cues

Review: Research Objectives

The following experiment is an investigation into the adaptive significance of ideological differences. It investigates whether individuals with liberal and conservative orientations differ in their behaviour during social interactions, and whether these differences are consistent with an adaptive strategy to maximize reciprocity. To evaluate these differences I examine how individuals on opposite sides of the ideological spectrum respond to social cues during a risky social interaction. Here, I test whether knowledge of an anonymous partner's attitudes towards social change and inequality affects the willingness of liberals and conservatives to trust.

By exposing participants to different social cues this experiment seeks to determine; 1) whether social attitudes towards change and inequality provide a cue about a partner's willingness to reciprocate; 2) whether liberals and conservatives respond differently to social information; 3) whether liberals and conservatives behave differently during a social interaction; and, 4) whether the observed behavioural outcomes are consistent with either the Group Reciprocity Hypothesis (GRH) or Social Risk Hypothesis (SRH) for adaptive behavioural strategies.

In evaluating the adaptive significance of ideological differences, this study refines present understandings of the behavioural dispositions associated with liberal and conservative orientations and how these dispositions respond to different social-environmental stimuli (Hibbing et al., 2014). For example, while Jost's research on ideology finds that liberal and conservative differences are primarily driven by attitudes towards the tolerance/intolerance of change and inequality, it is unclear what impact these

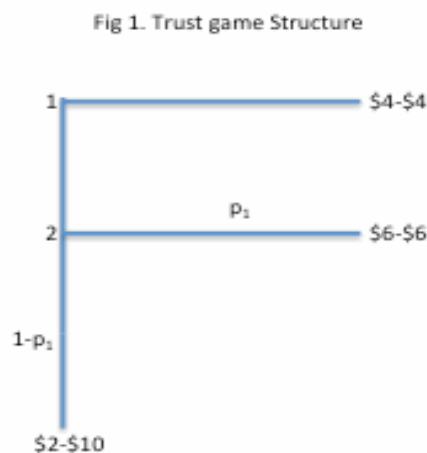
different dispositions have on individuals' social behaviour (Jost et al., 2009). As noted in Chapter 2, studies on conservative oriented individuals find that these individuals are more sensitive to negative environmental stimuli. However, it remains untested whether this sensitivity influences the social behaviour of conservative individuals (Hibbing et al., 2014).

In addition to the investigation into the effects of implicit attitudes on trust, the results of this study will be used in the development of two follow up experiments (outlined in Chapter 2), to further investigate the GRH and SRH on the adaptive significance of ideological differences.

Experimental Methods

To evaluate the potential adaptive utility of different social values, participants play a dichotomous one-shot trust game in which they are matched with an anonymous social partner. The trust game is modelled after the “voluntary trust game” developed by McCabe, Ridgon, and Smith (2003). Participants are randomly assigned to one of two player positions, Player 1 “the decider” and Player 2 “the allocator” (Fig 1). At the start of the game Player 1 is given the choice to “opt-in” and play the trust game with their partner, or “opt-out” of the trust game. If Player 1 chooses to opt-out, the game ends and both players, Player 1 and Player 2, receive a fixed reward of \$4 US. If Player 1 decides to opt-in, the total available prize pool is increased from \$8 US (\$4-\$4) to \$12 US; however, the decision on how to allocate the funds is made by Player 2. Player 2 has the option to either split the prize pool equally (\$6-\$6), or unequally (\$2-\$10). Player 1 is therefore faced with a dilemma, play the trust game for a chance at a higher reward, but with the risk of exploitation by their partner. Unknown to participants is that all participants in the study

are assigned to play as Player 1, and that Player 2 is a computer confederate. The use of deception is a necessary in order to control participants' exposure to the same series of implicit attitudes. On average participants completed the study in approximately 20 minutes. A series of control questions are employed throughout the study to screen participants who are not answering questions truthfully.



The dichotomous measure is employed based on considerations about the kinds of adaptive problems humans evolved to overcome. Many social interactions requiring trust, cooperation, and coordination, such as group hunting, childcare, and even food sharing, involve all-or-nothing considerations. (Hare et al., 2007; Price 2006; Tooby, Cosmides and Price 2003). In these conditions the benefits to individuals are entirely dependent on positive returns, and the losses from investments may be substantial to individual fitness (Nowak 2006). Consequently, a simpler dichotomous outcome is employed. The utility of the trust game is such that participants should not cooperate with their partner if they believe there is greater than a 35% chance that they will not reciprocate.

Treatments

After receiving the experimental instructions, participants experienced a 45 second delay at which point they are randomly assigned to complete *one of six* experimental Treatments. In each Treatment participants receive different pieces of information about their partner. Random assignment is accomplished by block-treating participants according to self-reported political orientation across a 7-point left-right Likert Scale and then randomly assigning individuals to a treatment. Left-right scales are used to coincide with the stimulus applied in Treatments 4 & 5.

A multi-treatment approach is used to control for possible confounding related to in-group out-group preferences by observing whether trust in liberals and conservatives is generally effected by conditions of minimal group identity (Peterson 2009; Smith et al., 2011; Yamagishi and Mifune 2008). Furthermore, by manipulating the type of the social cue presented to participants I am also able to evaluate the validity of the SRH by looking for trends in how individuals with different ideological orientations generally respond to socio-environmental cues. For example, comparing how trust in liberals and conservatives is affected by shared social attitudes, shared political orientation, and shared preferences for a favorite sport can separate the effects of a *specific* shared identity e.g. political orientation, from the effect of social information in general. In doing so, I hope to determine whether, as argued by the GRH, different ideological orientations show unique responses to specific social attitudes, or, as argued by the SRH, whether differences in ideological orientations are a product of differential responses to socio-environmental stimuli.

Treatments:

1. Treatment 1: Control
2. Treatment 2: Liberal Attitudes
3. Treatment 3: Conservative Attitudes
4. Treatment 4: Right Political Identity
5. Treatment 5: Left Political Identity
6. Treatment 6: Sport-In Group
7. Treatment 7: Sport-Out Group

In Treatment 1, “Control”, participants receive no information before participating in the trust game. In the remaining five treatments participants are presented with a series of questions, which they are informed are also being answered by their partner. After reviewing all of these questions participants experience a 15 second delay, after which they are presented with the responses given by their partner. In Treatments 2 & 3, “Attitudes”, participants are provided with their partner’s responses to questions about their social values in the form of implicit social attitudes concerning the structure and function of the social group. In Treatment 2, these responses indicate strong support for socially flexible and egalitarian environments. In Treatment 3, these indicate strong preferences for structured and normatively stable environments.

In Treatments 4 & 5, “Political Identity”, participants are informed of their partner’s political orientation based on a 7-point Likert Scale for left-right political orientation. A left-right political scale is used in order to evoke a sense of shared or unshared social values and political identity while avoiding a sense of out-group aggression which may be associated with the terms “liberal” and “conservative” within an American political context. In Treatment 4, partners indicate a right political orientation, and in Treatment 5, a left political orientation.

In Treatments 6 & 7, “Sports Preference”, participants are told that their partner is asked to declare whether their favourite sport is MLB Baseball or NFL football. In each case participants are informed that their partner’s favourite sport is NFL football. Within the statistical results Treatment 6 represents a sub-grouping of participants who also

indicated that they preferred NFL Football, and Treatment 7 represents all participants who indicated they preferred MLB Baseball (the opposite of their partner).

Treatments 2 and 3: Attitude Treatments

In Treatments 2 & 3, participants are provided with information about their partner's social attitudes in the form of implicit social attitudes (Smith et al., 2011). While in some psychological contexts the term implicit attitudes refers to a latency or bias in an individuals' ability to associate certain ideas with concepts, in this context implicit social attitudes are attitudes supporting opinions about the appropriate structure and function of the social group, such as the nature of social rules, order, self-conduct and identification of individuals within a social group. Implicit social attitudes are used as a proxy for attitudes towards social change and inequality. I use the "Society Works Best" implicit attitude measure developed by Smith et al., (2011). This measure was developed to predict ideological affiliation based on individuals' implicit preferences for the structure and function of social environments.³² The measure examines individual preferences for: (A) the appropriate role of traditional values and moral codes in social conduct; (B) the treatment of out-groups and rule breakers; (C) the nature and conduct of group leadership; (D) the role of individuals within the group; and (E) whether compromise or absolutism is the best approach to human relations. The measure is composed of 14 binary response questions, which are scored from 14-28 points. Within this sample the results are coded such that a score of 14 is strongly associated with liberal ideological orientation, and 28 with conservative orientation. A standard logistic regression of this measure on political

³² Measure is referred to as a implicit attitude test because Smith et al., 2011 used an implicit attitude test IAT, which measures the latency and bias in an individuals ability to relate two or more concepts, to determine the content of the specific questions in the measure.

orientation (Democrat=1, Republican=2) in this sample shows that higher scores on the implicit attitude measure are strongly correlated with Republican Party affiliation (Table 1).

Differences in the “Society Works Best” measure underlie specific value positions concerning the tolerance of social change and inequality. For example, preferences for an external moral code are related to preferences for normative stability (Smith et al., 2011). The attitude dimensions within the measure are also associated with a number of *hereditary* dispositions identified by the Wilson-Patterson Index, which are also strong predictors of ideological orientation. I use the “Society Works Best” measure to target behavioural differences that operate on a dispositional level; that is, on social intuitions below the level of partisan attachment.

The cues used in Treatments 2 & 3 consist of eight questions taken from the “Society Works Best” measure representing four of the five different social dimensions measured: 1) Traditional Values; 2) Out-groups/Rule Breakers; 3) Leadership styles; and 4) Individuals/Groups (see questions below). I focus on the four dimensions that Smith et al., (2011) show to have the strongest correlation to the Wilson-Patterson Index and self-placement. The full “Society Works Best” measure is listed in Appendix D (Smith et al., 2011). A response of 1 is associated with a more conservative political orientation, while a response of 2 is associated with a more liberal orientation. These scores are reversed during the statistical analysis.

Attitude Cues: Treatments 2 & 3

Traditional Values/Moral Codes:

Society works best when . . .

- 1-People live according to traditional values
- 2-People adjust their values to fit changing circumstances

Society works best when . . .

- 1-Behavioural expectations are based on an external code
- 2-Behavioural expectations are allowed to evolve over the decades

Society works best when . . .

- 1-Our leaders stick to their beliefs regardless
- 2-Our leaders change positions whenever situations change

Out-groups/Rule breakers:

Society works best when . . .

- 1-We take care of our own people first
- 2-We realize that people everywhere deserve our help

Society works best when . . .

- 1-Those who break the rules are punished
- 2-Those who break the rules are forgiven

Role of Group/Individual:

Society works best when . . .

- 1-Every member contributes
- 2-More fortunate members sacrifice to help others

Leadership:

Society works best when . . .

- 1-Our leaders are obeyed
- 2-Our leaders are questioned

Society works best when . . .

- 1-Our leaders call the shots
- 2-Our leaders are forced to listen to others

In Table 2, shows that there is a strong correlation between implicit attitudes questions used as cues and party affiliation.

Survey and Demographic Questions

Prior to the interaction, participants completed a 19-point demographic questionnaire, including age, education, ethnicity, income, religious affiliation, religious observance, and political orientation. Post interaction, participants complete the full measure of implicit attitudes; a 21-question Wilson-Patterson Index; a 10 factor personality model (Gosling, Rentfrow, and Swann 2003); and a 17-question measure of affective intensity (Larsen and Diener, 1985).

Ideological orientation is assessed using multiple measures, including a 7-point liberal-conservative Likert Scale, a 7-point left-right Likert Scale, by party affiliation (Democrat, Republican, Other), using a modified 21-question Wilson-Patterson Index, and a 14-question “Society Works Best” measure (Smith et al., 2011). Ideological orientation within the sample is Liberal $n=1,251$ (53.67%), Neutral $n=531$ (23.80%), Conservative $n=549$ (23.55%). Democrat $n=1,261$ (54.10%), Other $n=517$ (21.41%), Republican $n=553$ (23.73%).

Participant Sample

Participants are recruited from three online participant services: 1) Amazon Mechanical Turk (mTurk); 2) FindParticipants.com; and 3) SocialSci.com. Research shows that the behaviour of participants recruited from online study pools such as mTurk approximates the behaviour of in lab participants (Berinsky, Huber, and Lens 2012). The sample is restricted to US residents over the age of 18. Participants are asked to take part in an online “Survey and Experiment” in which they would complete an interaction with another study participant. Participants are told the study would take between 20-25 minutes to complete and that they could earn between \$2-\$10 US based on their decisions

during the interaction. The experiment is programmed and implemented using the online research tool Qualtrics. Experimental trials are conducted between October 2014 and May 2015.

During the study approximately $n=4200$ participants logged in to the experiment. A total of $n=2461$ participants completed the study. From the sample of $n=2461$ participants, 45 participants are identified by their IP address as having completed the study more than once; therefore these individuals are dropped from the statistical analysis. Three participants are removed for declaring in the participant feedback section that they did not believe they are participating with another person during the study. During one of the trials an error occurred in which the educational information of 360 participants is not correctly recorded. These participants were contacted by the researcher and asked to provide their educational information. Participants were offered an additional \$1 US for doing so. From the 360 participants who experienced the error, all but 82 responded to the email requesting their educational background. These 82 participants are dropped from the statistical analysis. The final number of participants is $N=2331$, MTurk $n=889$ (38.14%), FindParticipants.com $n=697$ (29.90%), SocialSci.com $n=745$ (31.91%). The mean SD age is 34 (11.47). Sex ratio of the study is Men $n=1,073$ (46.03%), Female $n=1,258$ (53.97%).

Deception

During the study participants are told that they would be interacting with another survey participant; in reality no other participant existed. Unbeknownst to them, all participants in the interaction are assigned to play as Player 1. This action constituted deception on the part of the experimenter. Deception is crucial in this experiment, following psychological protocol, in order to elicit behavioural effects as responses to the

targeted social values. Participants are fully debriefed by email at the end of the study. At the end of the study no participant objected to the use of deception.

Predicted Outcomes: Testing the Adaptive Significance of the Political Spectrum

In the following experiment I evaluate the feasibility of the Group Reciprocity Hypothesis and Social Risk Hypothesis to account for the utility of liberal and conservative behavioural differences. By observing how the behaviour of liberals and conservatives respond to social information during a risky social interaction I investigate whether different social attitudes themselves contain an element of adaptive social behaviour, or whether having certain social attitudes is the byproduct of some other adaptive traits.³³ If implicit attitudes are themselves a product of an adaptive strategy to maximize the absolute level of reciprocity during social interaction, then the experimental results should approximate the expectations of the Group Reciprocity Hypothesis. However, if implicit attitudes are simply a byproduct of some other adaptive characteristic, specifically a behavioural strategy to avoid social risks, then I expect the behavioural outcomes to approximate the expectations of the Social Risk Hypothesis. Below is a review of the expected outcomes of each hypothesis, which are outlined in Chapter 2.

³³ In the biological sciences the term “spandrel”, as used by Gould and Lewontin, refers to a phenotypic trait that is itself not adaptive, but is the byproduct of some other trait that is a direct product of adaptive selection. Individuals’ preferences for specific attitudes may reflect differences in behavioural dispositions. While the dispositions are a product of selection, the attitudes, which are simply a byproduct of the dispositions, are not (Gould and Lewontin 1979). One of the objectives of this experiment is to attempt to separate these two potential possibilities.

Group Reciprocity Hypothesis (GRH)

Hypothesis A1:

- Compared to Control conditions, liberal oriented individuals will display increased levels of trust in response to social values favouring normatively flexible and egalitarian social environments.

Hypothesis A2:

- Compared to Control conditions, conservative oriented individuals will display increased levels of trust in response to social values favouring normatively stable, well-structured, and hierarchical social environments.

Hypothesis A3:

- In both liberal and conservative oriented individuals the effect of knowledge of “shared” social values on levels of trust will be greater than the effects of knowledge of a shared “minimal” social identity, a shared preference for a favourite sport.

Hypothesis A4:

- In liberal and conservative oriented individuals the effects of “shared” political orientation on trust will be less than, or equal to, the effects of each group’s associated implicit attitudes.

Hypothesis A1 & A2 test whether liberal and conservative participants are sensitive to the effects of implicit attitudes towards social change inequality. According to the GRH, if ideological differences towards the tolerance of change and inequality are a product of alternative strategies to increase the absolute levels of reciprocity within a social group, then both liberal and conservative individuals should be sensitive to cues that a prospective social partner shares their attitudes. Treatment 2 “Liberal Attitudes” & Treatment 3 “Conservative Attitudes” provide a test of this hypothesis. Hypothesis A3 and A4 test whether the effect of implicit attitudes is different from the effect of shared identity, that attitudes provide individuals with a more salient social cue about a partner’s trustworthiness than a “minimal” social identity (Turner and Tajfel 1979; Yamagishi, Nobuhito, and Tohko 1999).

The purpose of Treatments 4 & 5 “Right and Left Political Orientation” is to allow for a test of Hypotheses A3 and A4 by comparing of the effect of implicit attitudes against the effect of a strong group cue, political orientation. This comparison is meant to rule out the possibility that the effects of implicit attitudes are a result of a strong salient cue of group identity (Yamagishi, Nobuhito, and Tohko 1999). If participants on *both sides* of the

ideological spectrum show a significant preference for implicit attitudes over shared political orientation, this result would strongly support the position that these attitudes are extremely important for social behaviour (Gintis, Smith, and Bowles 2001; Peterson 2009; Sosis and Bressler 2003; Van Vugt and Van Lange 2006). Alternatively, if political orientation provides a significantly stronger signal of trustworthiness, it weakens the argument that implicit attitudes reflect an adaptive strategy that signals the intentions of actors to cooperate as a mechanism to increase group reciprocity. More generally, observing that implicit attitudes do not significantly impact levels of trust raises flags about whether these attitudes provide a clear enough sense of shared intention to increase levels of interaction within a social group (Sosis and Ruffle 2004). Finding that political orientation matters and implicit attitudes do not matter suggests that these implicit attitudes did not evolve as a product of direct selection, but may be the byproduct of some other heritable trait. The second theoretical framework, the SRH, focuses on evaluating this alternative outcome.

Treatments 6 & 7 “Sport-In & Sport-Out” are presented as a further control against the affect of minimal group identity in Hypothesis A4. Observing that implicit attitudes and shared sports preference produce similar increases in trust in both liberal and conservative oriented individuals weakens the argument that implicit attitudes evolved as a mechanism to signal trustworthiness.

Theoretical Framework 2: Social Risk Hypothesis

The alternative hypothesis for the adaptive significance of liberal and conservative ideological orientations is that these individuals are relying on different strategies to avoid socio-environmental risks, specifically the risks of exploitation during social interactions.

The SRH argues that the behavioural differences associated with liberal and conservative orientation are a product of different behavioural dispositions towards environmental stimuli. As previously discussed, these dispositions cause certain individuals to be disproportionately sensitive to certain kinds of social-environmental stimuli, which in turn influences their behavioural responses within a given environment. As with the GRH, I evaluate the adaptive significances of these dispositions for social behaviour with a series of hypotheses.

In light of research showing that a greater sensitivity to negative stimuli in conservative oriented individuals, which is consistent with findings indicated that conservatives have increased volume and activity in the right amygdala, one possibility is that conservatives are attempting identify and/or discriminate against untrustworthy partners (Kanai et al., 2011; Hibbing et al., 2014). As a result of their strong sensitivity to negative stimuli, conservative oriented individuals may prefer highly structured and consistent environments, as these environments make it easier to monitor the behaviour and reputation of individuals in a group. Under these conditions individuals are better able to identify potential threats, and to discriminate against individuals viewed to be untrustworthy (Bernard et al., 2006; Boyd et al., 2003; Tooby and Cosmides 2003).

Accordingly, if conservative oriented individuals are employing a risk-avoidant strategy, which is based on sensitivity to negative stimuli and in which individuals develop preferences for socially stable environments as a mechanism to identify untrustworthy social partners, I expect to observe the following:

Hypothesis B1:

- ☐ Under the Control, no information condition, conservative oriented individuals will be more likely to trust than liberal oriented individuals.

Hypothesis B2

- ☐ Compared to Control, conservative oriented individuals will display decreased levels of trust in response to social values for normatively flexible and egalitarian social environments.

Hypotheses B1 is tested in Treatment 1 “Control”. Hypothesis B2 is tested by comparing the difference in levels of trust between Treatment 1 “Control” and Treatment 2 “Liberal Attitudes”. Treatments 5 “Left Political Orientation” and Treatment 7 “Sport-Out” provide further tests about greater sensitivity to negative cues in conservative oriented individuals.

The behavioural differences associated with liberal individuals also point to an alternative hypothesis. Previous studies indicate that, during a risky economic interaction such as a trust or investor game, liberal individuals contribute less to the interaction in comparison to conservative individuals (Sosis and Ruffle 2004)³⁴. Furthermore, a meta-study by Jost et al., (2003) finds that liberal individuals are strongly sensitive to levels of social equality (Jost et al., 2003; Jost, Federico, and Napier 2009). Together, these behavioural traits suggest that liberal individuals may be strongly sensitive to social fairness and to the risk of exploitation. As a result, liberal individuals may be approaching social interaction cautiously, withholding their full cooperation until provided with an indicator of a group’s or individual’s likeliness to reciprocate (Price, 2006; Van Vugt and Van Lange, 2006; Vigil, 2010). Studies find that liberal oriented individuals tend to display a larger volume and activity in the anterior cingulate cortex, which is an area of the brain associated with affective decision-making (Kinai et al., 2011). Moreover, during risky decision making liberal oriented individuals display greater activity in left insula cortex, an area involved in the representation of internal bodily cues for subjective feeling states, with emotional regulation related to signalling potential changes in interceptive states, and with changes in possible decision-related outcomes (Amodio et al., 2011; Dodd

³⁴ As discussed in Chapter 2, the initially higher levels of trust in conservatives reflect that conservatives may be less likely to adjust their behaviour between the standard conditions of their familiar social environment to the novel conditions of the experimental setting.

et al., 2012; Schreiber et al., 2011). This observation suggests that liberal oriented individuals are engaged in monitoring behavioural cues (both internal and external) and that liberal oriented individuals are disposed to change their behaviours in response to new information.

If liberal oriented individuals are employing a risk-averse strategy that is responsive to social information, I expect to observe the following:

Hypothesis B3:

- ☐ Compared to Control, trust in liberal but not conservative oriented individuals will be increased in response to shared implicit attitudes.

Hypothesis B4:

- ☐ Trust in liberal, as compared to conservative oriented individuals will be significantly higher in response to implicit attitudes for normatively flexible and egalitarian social environments.

Hypothesis B3 tested by comparing the difference in levels of trust in Democrats between Treatment 1 “Control” and Treatment 2 “Liberal Attitudes”. Treatments 5 “Left Political Orientation” and Treatment 6 “Sport-In” provide further tests of Hypothesis B3 on the greater sensitivity to positive cues in liberal oriented individuals. Hypothesis B4 is tested by comparing the difference in levels of trust between Democrats and Republicans in Treatment 2 “Liberal Attitudes” and Treatment 1 “Control”.

Because political identity is tied to complex social factors, including group competition, which are known to influence trust and cooperation (see West 2006), it is difficult within the SRH framework to predict whether unshared political identity will have a negative effect on trust among liberals and conservative participants.³⁵ Among conservative oriented individuals, no prediction is made about whether unshared political

³⁵ Due to the reliance on a U.S. based sample, left-right terminology is chosen to indicate shared or unshared political identity as opposed to liberal-conservative political identity to avoid possible out-group aggression associated with liberal-conservative political identities (Abramowitz and Saunders 2008; Fiorina and Abrams 2008). While U.S. residents are likely to be more familiar with the liberal-conservative terminology, the results show a strong correlation between left-right orientation and Democrat-Republican Party affiliation (Table 3).

orientation will result in a decrease in trust; however, observing such an effect would be consistent with the SRH. While no prediction is made about the effects of shared orientation on conservative oriented individuals, the expectation is that trust should not increase relative to Control. Similarly, as a liberal orientation is based around risk avoidance rather than sensitivity to threat, no negative effect is expected in response to unshared political orientation. While no positive effect is predicted in liberal oriented individuals in response to shared orientation, such an effect would also be consistent with the expectations of the SRH. More important to the overall expectations of the SRH is the prediction for trust in liberals and conservatives in response to implicit social attitudes for normative flexibility and inequality.

Statistical Approach

Results are calculated using a binary logistic regression of a heterogeneous model, with clustered standard errors. The dependent variable is trust, coded as (1= Trust), and (0 = No Trust). Standard errors are clustered around the online recruitment platform. The platform is coded as a three level categorical variable, with mTurk as the reference category. Effects are calculated as a two-way interaction between ideological orientation and treatment using a Lincom Function. Lincom functions are used to compute point estimates, standard errors and p-values for linear combinations of coefficients based on a fitted model. The Lincom command allows for measurement of effect sizes while accounting for initial differences in trust in the Control treatment.

In analyzing the experimental results I consider both the within and between subject effects. Within-subject effects report the difference in trust for individuals with the same ideological orientation between Control and a treatment conditions. Between-subject

effects report differences in trust for individuals with the different ideological orientations by looking at the change in trust between Control and treatment, for each ideological group, and then comparing these differences. This approach is analogous to a *differences and differences* statistical model.

Treatment is coded as a categorical variable, labelled 1-7. The Control treatment is coded as the reference category. In analyzing the experimental results, ideological orientation is assigned by Political Party Affiliation (Democrat, Republican, Other). Political Party Affiliation is an established proxy of liberal-conservative ideological orientation within a US sample (Levendusky 2009). While ideological orientation is assessed using multiple tools, Party Affiliation is chosen because it avoids some of the confusion and subjectivity associated with self-reported ideological orientation. As this experiment is interested in identifying possible behavioural differences underlying ideological orientation and not the efficacy of self-report measures, this decision is appropriate. A logistic regression (Table 3) shows a significant correlation between the odds of being Republican vs. Democrat, and having a conservative vs. liberal, or right vs. left orientation within this sample. Democrat is coded as the reference category (Democrat=0, Republican=1).³⁶

In the statistical analysis, ideological orientation is coded as a three level categorical variable (1=Democrat, 2=Republican, 3= Other) with Democrat as the reference category.

As a secondary analysis I present the statistical results with ideology scored according to scores on the implicit attitude measure. I regress each of the five implicit

³⁶ The difference in odds of being Republican between liberal-conservative and left-right orientations is just outside the 90% confidence range, odds (1.139) and (P=0.104). This effect disappears when oriented is coded as 3-point variable (liberal, neutral, conservative) (Left, neutral, conservative) (1.169) (P=0.313).

attitude dimensions separately. Participants are grouped into categories based on their score in each of the five dimensions. I utilize the same regression model to measure the effects for Democrats and Republicans. As this regression is meant as an additional check on the validity of the experimental results, I focus on the within-subject effects.

Models

The empirical results are presented across four different statistical models, labeled A-D. Models are presented as *odds ratios* for trust in each treatment. Model A is a strict interpretation of randomized experimental trials, with clustered standard errors. Model B includes control variables for age, education, ethnicity, income, religious observance, sex, sexual orientation, and an interaction between sexual orientation and political party. Model C includes all control variables plus a measure of the “Big 5” personality traits. A measure of personality traits is included to control for a possible confounding between personality traits sensitive to treatment. Model D includes Model C plus a continuous variable, which controls for a potential change in trust between the first and last experimental trials, which are conducted over a 7 month period.³⁷ In interpreting the statistical results I focus on the consistency of results across the models. Model fit is tested using Hosmer-Lemeshow tests, Pearson’s X^2 goodness-of-fit, and ROC Analysis. The covariance of the control variables is tested to identify any potential confounding factors (See Appendix A). The contribution of each individual control variable to the Models is evaluated using Wald and likelihood tests (See Appendix A). A full listing of all experimental results is listed in

³⁷ The variable that controls for the Time in Model D is strongly correlated with participant platform. Consequently, when drawing conclusions based on the statistical models I place greater weight on the consistency of effects across Models A-C.

Appendix A. A full comparison of the effect of each Treatment compared to all other Treatments, in Model A-D, is also listed in Appendix A.

Experimental Results

Summary of Results

The overall experimental results more closely resemble the interpretation of the Social Risk Hypothesis (SRH); that differences in the social values are consistent with being a product of alternative strategies for minimizing social risks. As predicted by the SRH in Hypothesis B1, under no information conditions Treatment 1 “Control”, levels of trust in Republicans is higher in comparison to Democrats (Table 5 & Fig 2). Also predicted by the SRH in Hypothesis B3 & B4, trust in Democrats shows consistent and significant positive response to Treatment 2 “Liberal Attitudes”, and Treatment 5 “Left Political Identity” (Table 6 & Fig 3). Finally, as predicted by the SRH in Hypothesis B2, trust in Republicans shows a significant negative effect in response to Treatment 2 “Liberal Attitudes” (0.878) ($P < 0.050$), as well as Treatment 7 “Sports-Out” (0.418) ($P < 0.050$) (Table 8 & Fig 4). Overall, in response to information about an anonymous partner no significant negative effects are observed in Democrats and no consistent positive effects are observed in Republicans (see Tables 6-8).

With respect to Hypothesis B3 & B4, in Treatment 2 “Liberal Attitudes”, Democrats show a highly significant increase in trust in response to attitudes towards normatively flexible and egalitarian social environments (Table 6 & Fig 3). This effect is significant relative to control ($P < 0.001$), and in comparison to levels of trust in Republicans in the same treatment ($P < 0.050$) (Table 7). The effect of these attitudes on

trust is also larger in comparison to shared minimal group identity, a preference for a favourite sport in Treatment 6 ($P < 0.050$) (Table 9). Additionally, as predicted by the SRH in Hypothesis B2, trust in Republican participants shows a significant negative effect in Treatment 2 “Liberal Attitudes”, relative to Control (Table 8 & Fig 4). Also as predicted by the SRH, no increase in trust is observed in Republican participants in response to Treatment 3 “Conservative Attitudes” (Table 8 & Fig 4).

In response to Treatment 5 “Left Political Identity” Democrats also display an increase in trust relative to Control. While this effect fails to reach significance in Model A, it does reach significance in Models B-D between 90% and 95% confidence levels (Table 6). The difference in trust between Democrats and Republicans in Treatment 5 “Left Political Orientation” also reaches significance at the 99% confidence level ($P < 0.001$) (Table 7). No significant differences are observed in the levels of trust in Republicans in response to Treatment 4 & 5 relative to Control Treatment (Table 8). The only significant increase in trust in Republicans, relative to Control, is observed in Model D of Treatment 6 “Sports-In”; however, this effect is not significant across Models A-C (Table 8).

Together, these results are consistent with the expectations of the SRH that liberal and conservative oriented individuals are differentially sensitive to positive and negative stimuli as part of alternative adaptive strategies to avoid the socio-environmental risks, such as the costs of exploitation. Below, I review the full experimental results with respect to the hypotheses of SRH in each treatment.

Fig 2:

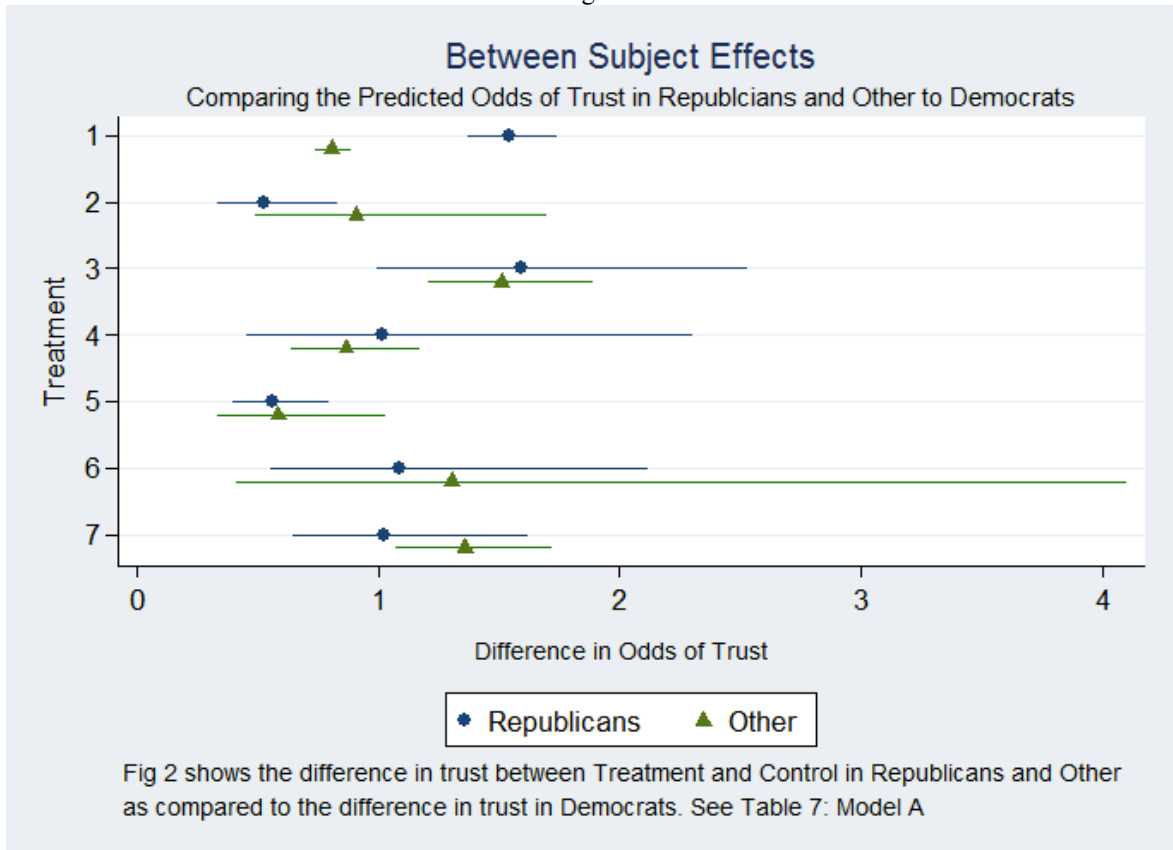


Fig 3:

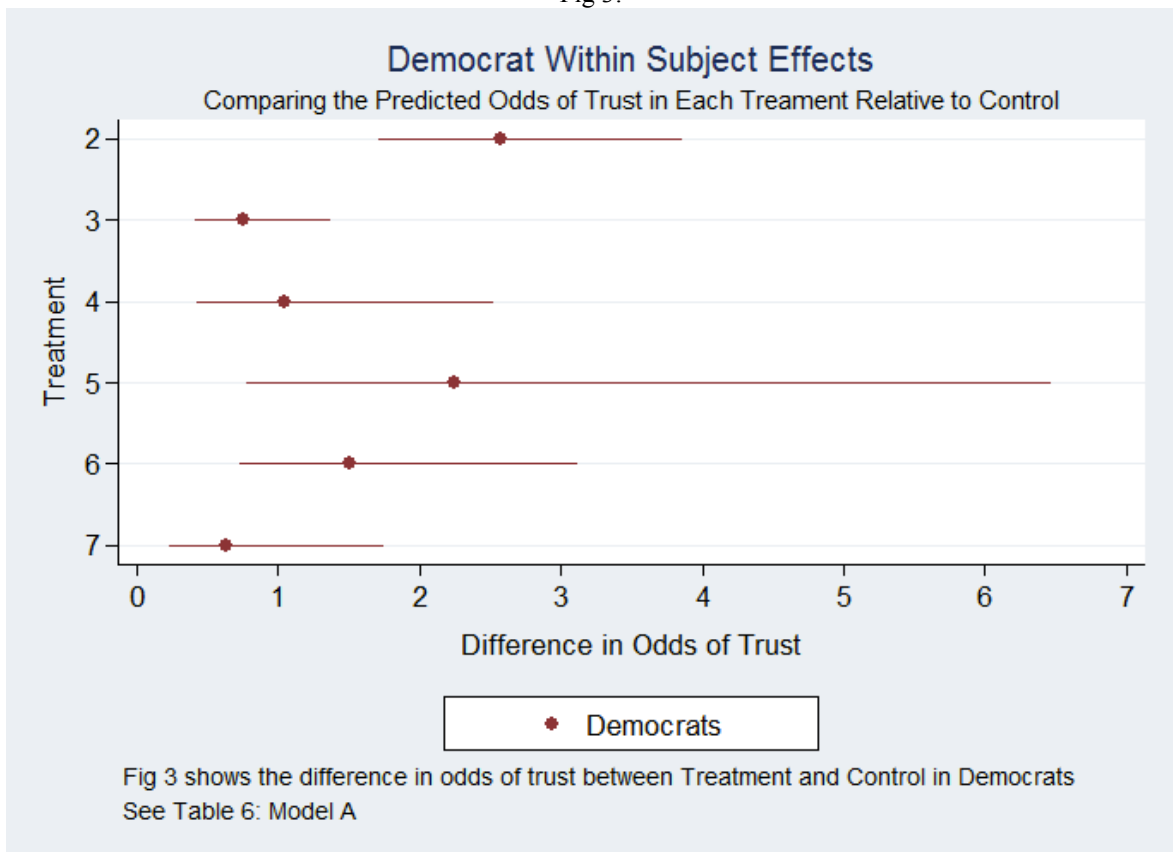
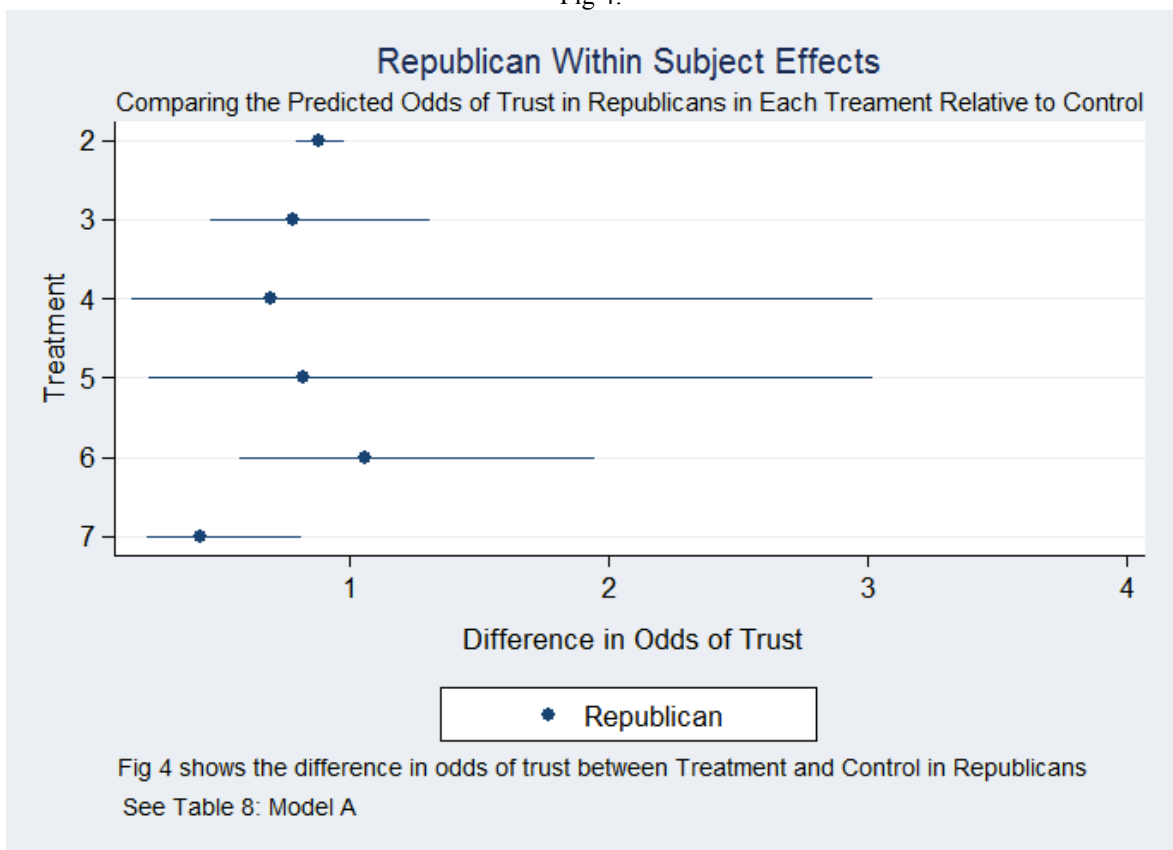


Fig 4:



Control Treatment

In Treatment 1, Control Treatment, levels of trust among Republicans are higher in comparison to Democrats. This effect reaches significance at the 99% confidence level ($P < 0.001$) across all four statistical Models (Table 5). Consequently, for *Hypothesis B1 I reject null*.

Attitude Treatments: Treatments 2 & 3

As predicted by the SRH, in Treatment 2 “Liberal Attitudes” trust in Democrats significantly increases relative to Control. This effect reaches significance at the 99% confidence level across Models A-D ($P < 0.001$) (Table 6). In Treatment 3 “Conservative Attitudes” trust in Republicans shows a negative trend relative to Control; however, this effect fails to reach significance (Table 8). Consequently, for *Hypothesis B2, I reject null*, for Hypothesis A1, *I reject null*, but for Hypothesis A2, *I fail to reject the null*.

Looking at the between subject effects, contrasting the effect of treatment to the effect of control for each group, in comparison to Republicans, trust in Democrats significantly increases in Treatment 2 “Liberal Attitudes”. This effect reaches significance at the 95% confidence level ($P > 0.050$) across Models A-D (Tables 7). Consequently, for *Hypothesis B3 I reject null*.

As further predicted by the SRH, in Treatment 2 “Liberal Attitudes” levels of trust in Republican participants decrease relative to control (Table 8). This effect reaches significance at or above the 95% confidence level ($P > 0.050$) across Models A-D. Consequently, for *Hypothesis B4, I reject null*.

Treatments 4 and 5: Left and Right Political Orientation

In Treatments 4 and 5 participants are matched with partners who held right or left political orientations. In response to Treatment 5 “Left Political Identity”, Democrat participants show an increase in levels of trust. This effect reaches significance at or above the 90% confidence level in Models B-D, but fails to reach significance in Model A (Table 6). Comparing the effect of implicit attitudes in Treatment 2 against shared orientation in Treatment 5 shows that there is no significant difference in levels of trust between the two treatments relative to Control Treatment (Table 10).

In response to Treatment 4 “Right Political Identity”, Republican participants do not show a significant change in levels of trust (Table 8). Comparing the effect of Treatment 3 “Conservative Attitudes” against shared orientation in Treatment 4 “Right Political Identity” (Table 10) shows no significant difference in levels of trust between the two treatments relative to Control Treatment. Therefore, for *Hypothesis A4*, I reject null.

Treatments 6 and 7: Sport-In and Sport-Out Groups

In Treatment 6 “Sport-In”, participants are matched to a partner with a shared social identity, “a preference for a favourite sport”. Looking at the between subject effects no significant differences are observed between Democrats and Republicans in either Treatment 6 “Sport-In” or Treatment 7 “Sport-Out” relative to Control Treatment.

Looking at the within subject effects for Democrats and Republicans, knowledge of a shared sports preference had a positive effect on trust relative to Control Treatment. However, for both Democrats and Republicans this effect only reaches significance in Model D, where it reaches significance at 95% confidence level (Tables 6 & 8). Among

Democrats comparing the effects of Treatment 2 “Liberal Attitudes” and Treatment 6 “Sport-In” on levels of trust shows that the effect of shared identity in Treatment 6 is less than the effect of attitudes for normatively flexible and egalitarian environments in Treatment 2, relative to Control Treatment. This effect reaches significance at or above the 95% confidence level across Models A-D (Table 9). Among Republicans comparing the effects of Treatment 3 “Conservative Attitudes”, attitudes for normatively stable and structured social environments, and Treatment 6 “Sport-In” on levels of trust show that the effect of conservative attitudes on trust in Treatment 3 are less than the effects of shared sports preferences in Treatment 6 (Table 9). However, this effect is only significant in Model D, where it reaches significance at the 95% confidence level. Consequently, for *Hypothesis A3, I reject null.*

Additionally, in Treatment 7 “Sport-Out” trust in Republicans are significantly lower as compared to Control Treatment. While this effect reaches significance between the 90%-95% confidence level (Table 8), some caution is required in interpreting this effect due to the small sample size in this treatment (n=138).

Treatment Effects by Score on the Liberal and Conservative Attitude Measure

The objective of this section is to observe whether liberal and conservative oriented participants show the same basic pattern of behaviour in response to treatment when ideological orientation is assigned based on scores to the overall “Society Works Best” measure (Table 11). I focus on the within subject effects (for the between subject effects see Appendix A, pg. 316). Participants grouped according to their responses on each of the five attitude dimensions of the “Society Works Best” measure; 1) Traditional Moral Codes, 2) Out-groups/Rule Breakers, 3) Role of Individuals/Group, 4) Leadership; and, 5)

Absolutes. Participants are coded as categorical variables based on their score in each of the five implicit attitude dimensions. Category 1 is associated with a strong liberal orientation. Category 1 is coded as the reference category for all five dimensions. The results show that assigning ideology by attitudes produces the same basic pattern of responses to treatment as assigning ideology by Political Party.

Table 11 shows that in Treatment 2 “Liberal Attitudes” trust in individuals whose scores reflect a strong liberal orientation, category 1, significantly increases relative to Control Treatment. This effect reaches significance at the 99% confidence level. Looking at individuals whose scores reflect a strong conservative orientation, categories 3 & 4, a significant negative effect is observed across three of the five attitude dimensions relative to Control Treatment; 1) Traditional Moral Codes, 2) Out-groups/Rule Breakers, and 3) Role of Individuals/Group. In the Moral Code and Out-group dimensions this effect reaches significance at the 95% confidence level. In the Role of Individuals/Group dimension this effect reaches significance at the 90% confidence level. Noteworthy is that there is a positive effect in Category five of the Out-group dimensions, and that this effect reaches significance at the 95% confidence level.

Looking at Treatment 3 “Conservative Attitudes”, trust in individuals with a strong liberal orientation, Category 1, is not significantly different relative to Control Treatment. Among individuals with a strong conservative orientation, Category 4, a significant negative effect is observed in the Out-group dimension. This effect reaches significance at the 90% confidence level. Importantly, no negative effect is observed among strong liberals in response to out-group implicit attitudes and no positive effect is observed in strong conservatives in response to in-group implicit attitudes, further supporting the hypotheses of SRH.

Discussion

As predicted by the SRH, Democrats display higher levels of trust in response to knowledge that a social partner preferred a normatively flexible and egalitarian social environment, while trust in Republicans decreases in response to the same social information. While Democrats show several *consistent and significant* increases in trust, relative to Control, contrary to the expectations of the GRH no *consistent and significant* increases in trust are observed in Republicans (although a positive trend is observed in Treatment 6). Also consistent with the SRH, Republicans show several significant negative effects, the most consistent and significant of which are in response to Treatment 2 “Liberal Attitudes” and Treatment 7 “Sports-Out”. No significant negative effects are observed in Democrats.

These initial results provide strong support for the SRH; however, further consideration should be given to separating strong in-group effects associated with shared social and political identity from sensitivity to fairness/inequality. Specifically, it is important to determine whether liberal oriented participants are experiencing a positive response to a strong in-group social cue, in the form of the rich implicit attitude measure, or whether liberals are employing an adaptive strategy that is sensitive to positive social indicators. A second problem concerns the interpretation of conservative results and a possible confounding effect with conservative attitudes. While the “Society Works Best” attitude measure appears to capture liberal attitudes it is possible, but unlikely, that trust in conservative participants did not increase because the measure failed to provide a salient cue of conservative attitudes. In other words, the complexity and richness of the implicit attitudes measure may have created too much noise to provide an adequate social cue about individuals’ attitudes towards social structure and stability.

A third problem, which stems from the usage of implicit attitudes as social cues, is that the content of these attitudes may produce differences in demand effects in liberals and conservatives. Demand effects refer “to changes in behaviour by experimental subjects due to cues about what constitutes appropriate behaviour” (Zizzo 2010 pg. 76). For example, the phrase “We realize that people everywhere deserve our help” may prime individuals about expectations about appropriate behaviour, e.g. trust, more than a statement such as “We take care of our own people first”. As this experiment does not directly control for differences in demand effects in liberals and conservatives, though it does control for this indirectly through the use of a multiple treatment design, it is possible that the higher levels of trust in liberals in response to implicit attitudes are being driven by differences in sensitivity to expectations about what is appropriate behaviour. A further criticism is that by relying information about partners’ preferences for the structure and function of the social group, such as preferences for social fairness and egalitarianism, implicit attitudes maybe creating expectations about the likelihood that a partner will reciprocate. Consequently, the differences in levels of trust between Treatment 2 “Liberal Attitudes” and Treatment 3 “Conservative Attitudes” maybe driven by the expectation that partners with liberal implicit attitudes are more likely to reciprocate. This argument is analogous to the argument of the GRH, that certain social attitudes provide cues about the willingness of individuals to engage in reciprocity, if restricted only to liberal participants.

To address these three concerns I explore the responses of liberals and conservatives to social information in two further experiments on the effects of inequality and social change on levels of group cooperation. In doing so, I control for confounding effects linked to shared group identity, and the complexity of social attitudes, with the goal that this will rule out, or at least limit, possible confounding related to differences in sensitivity to demand effects. In Experiment 2, I focus exclusively on the effects of fairness and group inequality on individuals’ contributions to a communal good. In Experiment 3, I

focus on the effects of a normatively unstable or conflicted environment on individuals' contributions to a communal good. In conducting these two experiments I more closely evaluate the hypotheses of the GRH that liberal and conservative differences reflect alternative strategies to maximize the absolute level of reciprocity within a group. I am also able to evaluate the predictions of the SRH regarding the responsiveness of liberal and conservative individuals to environmental stimuli.

Tables

Table 1: Logistic Regression of Increasing Score on the Implicit Attitude Measure and Odds of Having Democrat vs. Republican Party Affiliation. Higher Scores Predict a Republican Orientation

Con-Lib Preference	Coef.	Std. Err	Z.	P> z	95% Conf. Interval
Works Sum	1.538	0.035	19.05	0.000	1.471 1.608
cons	0.019	0.004	-21.33	0.000	0.013 0.027

Works Sum is a continuous measure of implicit social attitudes scored on a 14-28 point scale. Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.0

Table 2: Logistic Regression of Increasing Score on Implicit Attitude Social Cues and Odds of having Democrat vs. Republican Party Affiliation. Higher Scores Predict a Republican Orientation

Con-Lib Preference	Coefficient	Std. Err	Z.	P> z	95% Conf. Interval
Works Cue	1.825	0.059	18.76	0.000**	1.714 1.944
cons	.031	0.005	-21.50	0.000	0.022 0.042

Works Cue is continuous measure of individuals' response to implicit attitudes questions used as cues in Treatments 2 & 3. Works Cues is scored on a 1-8 scale. Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.0

Table 3: Logistic Regression of Increasing Scores on Liberal-Conservative and Left-Right Self-Report Ideology and Odds of Being Democrat vs. Republican. Self Orientation is Measured on a 7-Point Likert Scale

Model	Odds Ratio	Std. Err	Z.	P> z	95% Conf. Interval
Lib-Con	2.008	0.103	13.58	0.000***	1.816 2.220
Left-Right	1.761	0.086	11.61	0.000***	1.608 1.938
cons	.003	.001	-22.34	0.000	0.002 0.005

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.0

Table 4: Logistic Regression of the Odds of Trust in Each Treatment Compared to Control

Variable	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.982	.064	0.000***	1.860 2.112
Treatment 3	.868	.211	0.561	0.538 1.400
Treatment 4	.968	.508	0.951	0.346 2.709
Treatment 5	1.622	.801	0.327	0.616 4.270
Treatment 6	1.535	.668	0.325	0.654 3.601
Treatment 7	.658	.321	0.390	0.253 1.711
Find Participants	1.772	.182	0.000	1.448 2.168
SocialSci	1.790	.180	0.000	1.469 2.180
cons	1.401	.392	0.229	0.809 2.428

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 5: Between Subject Effects: Comparing the Odds of Trust by Political Party Affiliation in Control Treatment. Democrat Affiliation is Coded as the Reference Category

Model	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Pol-Other	.809*** (0.038)	.798*** (0.191)	.789** (0.062)	.811*** (0.049)
Pol-Republican	1.546*** (0.095)	1.267*** (0.086)	1.372*** (0.054)	1.390*** (0.030)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 6. Within Subject Effects: Comparing Odds of Trust in Democrats in Each Treatment to Democrats in Control Treatment

Model Pol Party Democrat	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Treatment 2	2.573*** (0.532)	2.595*** (0.610)	2.616*** (0.649)	2.682*** (0.711)
Treatment 3	.755 (0.230)	.723 (0.243)	.721 (0.231)	.714 (0.233)
Treatment 4	1.045 (0.472)	1.111 (0.527)	1.170 (0.498)	1.383 (0.424)
Treatment 5	2.246 (1.212)	2.503* (1.426)	2.621* (1.436)	3.106** (1.176)
Treatment 6	1.506 (0.558)	1.579 (0.679)	1.583 (0.613)	1.932** (0.607)
Treatment 7	.630 (0.328)	.697 (0.400)	.736 (0.398)	.862 (0.324)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 7: Between Subject Effects: Comparing Odds of Trust in Democrats to Republicans in each Treatment

Model Pol Party Republican	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Treatment 2	1.896** (0.445)	2.262*** (0.459)	2.212*** (0.001)	2.158** (0.533)
Treatment 3	0.629** (0.149)	0.741 (0.160)	0.708* (0.146)	0.692 (0.162)
Treatment 4	0.980 (0.407)	1.066 (0.508)	0.953 (0.461)	0.991 (0.475)
Treatment 5	1.772*** (0.309)	2.163*** (0.362)	2.020*** (0.289)	2.052*** (0.318)
Treatment 6	0.920 (0.314)	0.985 (0.324)	0.906 (0.274)	0.897 (0.264)
Treatment 7	0.975 (0.229)	1.098 (0.248)	0.971 (0.239)	0.951 (0.207)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 8: Within Subject Effects: Comparing Odds of Trust in Republicans to Republicans in Control Treatment

Model Pol Party Republican	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Treatment 2	.878** (0.048)	.906** (0.043)	.862*** (0.023)	.894*** (0.020)
Treatment 3	.776 (0.207)	.770 (0.181)	.742 (0.202)	.743 (0.209)
Treatment 4	.689 (0.520)	.823 (0.650)	.894 (0.696)	1.004 (0.550)
Treatment 5	.820 (0.545)	.913 (0.579)	.946 (0.591)	1.089 (0.486)
Treatment 6	1.059 (0.329)	1.266 (0.472)	1.274 (0.439)	1.549** (0.215)
Treatment 7	.418** (0.141)	.501* (0.060)	.552* (0.174)	.652** (0.102)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 9: Within Subject Effects: Comparing the Effect of Implicit Attitudes vs. Shared Identity on Odds of Trust

Model	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Democrats 2 vs. 6	1.708*** (0.281)	1.643** (0.324)	1.653*** (0.231)	1.388** (0.205)
Republicans 3 vs. 6	.733 (0.350)	.608 (0.308)	.583 (0.265)	.479** (0.140)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 10: Within Subject Effects: Comparing the Effect of Implicit Attitudes vs. Shared Political Identity on Odds of Trust

Model	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Democrats 2 vs. 5	1.146 (0.406)	1.037 (0.491)	.998 (0.324)	.863 (0.098)
Republicans 3 vs. 4	1.126 (0.916)	.935 (0.798)	.830 (0.667)	.739 (0.416)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 11: Within Subject Effects: Odds of Trust by Score in each Five Dimensions of Implicit Attitudes Compared to Control

Model	Moral Code Odds Ratio	Outgroup Odds Ratio	Role of Group Odds Ratio	Leadership Odds Ratio	Absolute Odds Ratio
Treat 2. Cat 1	3.744*** (0.271)	17.481*** (11.647)	3.668*** (0.886)	2.236*** (0.142)	2.794*** (0.643)
Treat 2. Cat 2	.777 (0.196)	2.289* (0.989)	1.773*** (0.190)	1.693* (0.491)	1.464* (0.312)
Treat 2. Cat 3	1.151 (0.606)	1.640** (0.397)	2.457*** (0.461)	1.109 (0.245)	1.229 (0.317)
Treat 2. Cat 4	.839** (0.062)	.896** (0.050)	.739* (0.115)		
Treat 2. Cat 5		2.121*** (0.432)			
Treat 3. Cat 1	.961 (0.354)	1.196 (0.749)	.826 (0.115)	.690 (0.215)	1.115 (0.132)
Treat 3. Cat 2	.475 (0.252)	.639 *** (0.083)	.799 (0.360)	1.202 *** (0.054)	.859 (0.146)
Treat 3. Cat 3	.711 (0.277)	.729 (0.239)	1.080 (0.378)	1.019 (0.165)	1.011 (0.224)
Treat 3. Cat 4	.952 (0.415)	.673 * (0.158)	.734 (0.184)		
Treat 3. Cat 5		1.707** (0.305)			
Treat 4. Cat 1	1.075 (0.466)	1.160 (0.880)	.803 (0.326)	1.019 (0.604)	1.026 (0.599)
Treat 4. Cat 2	.668 (0.544)	.737 (0.297)	.881 (0.537)	1.104 (0.546)	1.072 (0.232)
Treat 4. Cat 3	.850 (0.883)	.984 (0.582)	1.943 (1.285)	.619 (0.317)	.532 (0.610)
Treat 4. Cat 4	.805 (0.147)	.863 (0.521)	.606 (0.372)		
Treat 4. Cat 5		1.392 (0.681)			

Treat 5. Cat 1	2.069 (1.105)	2.813 (3.452)	2.814 (1.898)	1.923 (1.116)	1.677 (1.060)
Treat 5. Cat 2	1.576 (0.966)	1.474 (1.041)	1.130 (0.749)	1.272* (0.182)	1.670 (0.595)
Treat 5. Cat 3	1.074 (0.852)	1.774 (1.009)	3.086** (1.326)	.952 (1.319)	1.163 (0.708)
Treat 5. Cat 4	.762* (0.120)	1.236 (0.298)	.669 (0.193)		
Treat 5. Cat 4		1.689 (0.837)			
Treat 6. Cat 1	1.689 (0.693)	2.374 (1.892)	1.386 (0.609)	1.498 (0.718)	1.235 (0.490)
Treat 6. Cat 2	1.225 (1.272)	1.141 (0.356)	1.372 (0.996)	1.747 (0.806)	2.163* (0.980)
Treat 6. Cat 3	1.813 (1.561)	1.514 (0.420)	2.792* (1.491)	1.574 (1.268)	1.774 (0.780)
Treat 6. Cat 4	1.010 (0.309)	1.243 (0.710)	.975 (0.076)		
Treat 6. Cat 4.		2.293* (1.086)			
Treat 7. Cat 1	1.484 (1.051)	.762 (0.808)	.690 (0.244)	.770 (0.455)	.937 (0.439)
Treat 7. Cat 2	.118 *** (0.056)	.691 (0.281)	.515 (0.511)	.615 (0.254)	.403 * (0.199)
Treat 7. Cat 3	.324 (0.295)	.463 (0.391)	1.045 (0.752)	.219 ** (0.171)	.495 (0.304)
Treat 7. Cat 4	.420 (0.242)	.574 (0.290)	.443 *** (0.029)		
		1.092 (0.118)			

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Chapter Four: Experiment Two

Effect of Inequality on Cooperative Behaviour in Social Groups

Experiment 1 tested whether implicit social attitudes towards the tolerance/intolerance of social change, inequality, and hierarchy affected the willingness of liberals and conservatives to trust an anonymous social partner. The results of this first experiment are consistent with the expectations of the Social Risk Hypothesis (SRH); that in comparison to Control Treatment, trust in liberal oriented individuals would increase when presented with a positive social cue in the form of shared implicit attitudes, while trust in conservative oriented individuals would decrease when presented with a negative social cue in the form of unshared implicit attitudes. While the results of Experiment 1 support the argument of the SRH that ideological orientations may be based on differences in sensitivity to socio-environmental stimuli, reflecting alternative strategies towards socio-environmental risk, several questions remain outstanding. First, could the effects in Experiment 1 be a product of measurement bias in the implicit attitude measure used to capture conservative social attitudes? In particular, could the fact that conservatives fail to increase cooperation be the result of the implicit attitudes being more representative of liberal as opposed to conservative attitudes, or the complexity of the measure being to distracting to provide an adequate signal of trustworthiness. Second, what is the utility, if any, of the different attitudes towards social change and inequality that are associated with liberal and conservative ideological orientations? Do different attitudes have a specific utility, or are the attitudes a byproduct of some other adaptive behaviour?

Focusing on the liberal dimension of the ideological spectrum this second experiment further investigates the claims of the Group Reciprocity Hypothesis (GRH) and SRH concerning the adaptive utility of attitudes towards the tolerance and intolerance

of inequality. Here, I attempt untangle whether, as argued by the GRH, different social attitudes reflect a unique strategy for promoting interactions within a social group, or whether, as argued by the SRH, that different social attitudes reflect different strategies for avoiding socio-environmental risk. The objective of this experiment is to observe the possible behavioural utilities associated with differences in ideological orientation and to determine whether the effect of inequality on cooperation in liberals and conservatives is consistent with the predictions of the GRH or the SRH (Van Vugt and Van Lange 2006).

To investigate the adaptive utility of social attitudes towards the intolerance of inequality I test whether the actual conditions of intragroup inequality have an effect on cooperative behaviour during a one-shot communal goods game. I further examine whether the cooperative behaviour of liberals and conservatives is disproportionately affected by the conditions of intragroup inequality. Accordingly, the following experiment asks the question: do liberal and conservative oriented individuals respond differently to conditions of social inequality?

If the claims of the GRH concerning the adaptive utility of attitudes towards inequality are correct, that liberal differences reflect a strategy to maximize the level of reciprocity within a social group, then cooperation in liberals, but not conservatives, should be sensitive to conditions of a general social inequality (Anderson, Mellor, Milyo 2008; Gintis, Smith, and Bowles 2001). However, if the SRH is correct then the presence of a general inequality within a social group should *not* have an affect on the level of cooperation in liberals (Kanai et al., 2011; Schreiber et al., 2013). However, cooperation in liberals will be positively affected by cues indicating the desire of group members to cooperate fairly. Furthermore, if the SRH is correct, cooperation in conservatives will *not* be sensitive to positive cues indicating the desire of the group cooperate fairly, but *will* be sensitive to negative cues that group members may not be willing to cooperation fairly (Kanai et al., 2011; Schreiber et al., 2013).

Experimental Methods

The proceeding experiment is based on a modified version of a communal goods game first developed by Anderson, Mellor, Milyo (2008). In the original experiment, inequality is introduced into the interaction by awarding participants different fixed payments. These payments, which range from \$4-\$20 US, are announced publicly to groups of participants prior to the interaction. Participants who receive the high payout are also publicly praised by the experimenters for their good fortune. This structure is employed so that the inequality between players is independent of the number of tokens each player obtains during the communal goods game; e.g. not a direct function of their participation in the communal goods (Anderson, Mellor, Milyo 2008). In the proceeding experiment, rather than assigning a random fixed payment I manipulate *the payout* of the communal goods game to induce an inequality between players. Players are assigned to different Treatments in which different group members earn different payments for each token they receive during the communal goods. For example, in Treatments 2 & 3 players are assigned to a group in which Players 1-3 earn (\$0.13) per token while Players 4-6 earn (\$0.07) per token. This distribution has the effect of introducing an inequality between group members that is independent of their specific contribution to the communal goods - the inequality between players is independent of the number of tokens they contribute to the communal goods. Unlike in the experiment by Anderson, Mellor, Milyo (2008), participants are *not* praised for receiving the high payout; however, each member of the group is able to observe their own payout and the payouts of other group members. Participants are not aware that the payouts may differ between groups.

Communal Goods Game

The experimental interaction is based on a standard communal goods game. Participants are randomly assigned into groups of six and are awarded 20 tokens. Participants may allocate between 0-20 tokens to the communal goods. Every token allocated to the communal goods is multiplied by 1.5x. The total number of tokens allocated is then divided by the number of players in the group and added to each player's remaining tokens. Players earn real money in \$US for each token they have at the end of the communal goods game. The value they earn per token is manipulated during the experiment and consists of either (\$0.13), (\$0.11), (\$0.10), or (\$0.07) per token. Players can earn between \$0.35-\$5.85 US in total from the game. Most players completed the study in less than 20 minutes. The average payment is \$2.33 US, with payment ranging from \$0.67 US to \$4.85 US.

Treatments

Participants are randomly assigned to complete *one of six* treatments based on block treatment of self-reported political orientation on a 7-point Likert scale (1/3=1 “liberal”) (4=2 “neutral”) (5/7=3 “conservative”). Across these six treatments I vary the amount of money participants receive for each token earned during the communal goods. Prior to the interaction each participant is able to observe how much each other player of the group will earn per token; however, participants are not aware that the payouts in their group may differ from those of other groups. In Treatment 1, “Control Treatment,” all participants earn an equal (\$0.10) per token. In the remaining Treatments (2-6), groups are randomly divided, with half of the participants in a group earning a high payout of (\$0.13) per token, and the other half of the group earning a low payout of (\$0.07) per token.

Participants are informed that they are being randomly assigned to a player position.

Treatment number refers to the payout per token which players are assigned to receive in each pair of Treatments. Treatments pairs that correspond to high and low payouts are as follows Treatment 1, 2&3, 4&6, 5&7.

In Treatment 2 “High Payout”, participants are randomly assigned to earn the high payout (\$0.13), and Treatment 3 “Low Payout”, participants are assigned to earn the low payout (\$0.07). In Treatments 6 & 7 participants are assigned to receive the high payout (\$0.13), but are given the option to redistribute the payout so that all players in the group, including themselves, would earn the same payout of (\$0.11) per token. Treatment 6 “Redistribution” is a grouping of all participants who *choose* to redistribute the payouts, and Treatment 7 “No Redistribution” is a grouping of all participants who *did not choose* to redistribute the payouts. In Treatments 4 & 5, participants are initially assigned to receive the same low payout (\$0.07), but are informed that participants in the high payout position - Treatments 6 & 7 - are being given the option to redistribute the payouts so that each participant earns (\$0.11). In Treatment 4 “Fair Payout”, participants are informed, prior to the interaction, that the high payout players from Treatment 6 chose to redistribute the payouts. In Treatment 5 “Unfair Payout”, participants are informed that the high payout players from Treatment 7 did not choose to redistribute the payouts to the group. In calculating participants’ payouts participants are matched to individuals in corresponding treatments; e.g. three participants from Treatment 2 “High Payout” are matched with three participants from Treatment 3 “Low Payout”.

Treatments:

1. Control: Equal Payout
2. Treatment 2: High Payout
3. Treatment 3: Low Payout
4. Treatment 4: Fair Payout
5. Treatment 5: Unfair Payout
6. Treatment 6: Redistribution
7. Treatment 7: No Redistribution

Participants

A sample of 1245 participants is recruited from Amazon mechanical Turk (mTurk). Participants are drawn from a larger sample of 4000 mTurk participants who had completed a 2-minute demographic survey prior to the study. Research shows that the behaviour of participants recruited from mTurk approximates the behaviour of in lab participants (Berinsky, Huber, and Lens 2012). Participants are paid (\$0.10) for completing the short survey. Participants are recruited based on a self-reported liberal-conservative orientation based on a 7-point Likert scale. During recruitment participants are informed that the study would consist of a short survey and an experiment during which participants would be matched with other mTurk users to complete an interaction. Participants are told that they could earn between (\$0.35-\$5.85) for their participation. No deception is used during this study. Participants are told that they would be assigned to groups after all participants had completed the study. Following the strategy method, (Brandts and Charness 2009) participants are told that, in situations where they are provided information about the responses of other participants, they would be matched with participants who gave these actual responses during the study. This information is repeated to all participants prior to the interaction. Participants also read a short statement about the norms against the use of deception in experimental research. Experimental trials are completed between April and July of 2016. A series of control questions are employed throughout the study to screen out participants who are not answering truthfully.

Survey and Demographic Questions

Total sample is N=1245, with a mean age of (35.74) years. Sample sex is (50.68%) Male and (49.32%) Female. Political orientation across a 7-point self-report Likert scale is Liberal (n=547), Conservative (n=581), Neutral (n=117).³⁸ Prior to the interaction, participants completed a 19-point demographic questionnaire, including age, education, ethnicity, income, religious affiliation, religious observance, political orientation, and a 10 factor personality model (Gosling, Rentfrow, and Swann 2003). Post interaction, participants completed the full measure of implicit social attitudes, and a 21-question Wilson-Patterson Index (Smith et al., 2011). Prior to the interaction, a series of control questions are employed to ensure that participants are reading questions correctly. Participants are also required to answer a series of questions to ensure that they correctly understand the experimental interaction. A 50 second delay separated the end of the comprehensive questions and the start of the experimental interaction at which point participants are assigned to Treatment. There is no delay between assignment to a Treatment and the start of the communal goods game.

During the statistical analysis, ideological orientation is assessed using participants' overall responses to the Wilson-Patterson Index (Appendix D).³⁹ Unlike in Experiment 1 where ideological orientation is captured using Political Party Affiliation, in this experiment ideological orientation is captured by the Wilson-Patterson Index in order to better focus on the relationship between behavioural differences and specific political

³⁸ Sample size is based on a statistical power test using a two sample two mean equality. Tests indicated a minimum sample of n=74 participants per Treatment. The test is based on a mean of 10 units, and assumed a 1.6 unit effect size, a standard deviation of 3.5 units, and a sampling ratio of 1. Effect size and standard deviation are estimated based on the result of a pilot study involving 60 participants. Based on the seven treatments in this experiment a base sample of N=1036 is required. Additional participants are included, ensuring a sufficient number of participants who chose not to redistribute the participant payments. A total of 1600 participants of the 4000 participants who completed the demographic pilot received an invitation to complete the study.

³⁹ Wilson-Patterson Index is one of the most commonly used measures of ideological orientation within research on social or political psychology (Smith et al., 2011).

attitudes related to the tolerance of inequality, such as gender equality, social welfare, or foreign aid. This approach has the additional benefit of avoiding potential confounding effects between ideological orientation and political identity, which may result from the events of the 2016 United States presidential election campaign.

The Wilson-Patterson Index is composed of 21 questions that ask participants if they agree, disagree, or are unsure of whether they support specific socio-political issues, such as Gender Equality, Foreign Aid, or Military Spending (Smith et al., 2011). Possible scores on the overall Wilson-Patterson Index range from (-21 / +21). A score of -21 is strongly associated with a liberal orientation and a score of +21 with a conservative orientation. Table 1 shows the correlation between the Wilson Patterson Index and self-report ideological orientation on a 7-point Likert scale. Scores on the Wilson-Patterson Index within this sample range from (-19 / +16), with a mean score of (-2.275). These responses are recoded into three categorical variables ranging from (-21/-3=1 “liberal”) (-2/1=3 “neutral”) (2/21=2 “conservative”). The asymmetric distribution of the categories is done to provide a sufficient number of participants in the conservative category. The ideological breakdown of the full Wilson Patterson Model is liberal (n=631), conservative (n=416), neutral (n=198). A regression model with an alternative coding is listed in Appendix B (-21/-2=1 “liberal”) (-1/1=3 “neutral”) (2/21=2 “conservative”); the results of this model are consistent with the findings of the model listed above.

A second model listed in Appendix B assesses ideological orientation based on individual’s support for four socio-political issues related to inequality: 1) Women’s Equality; 2) Social Welfare; 3) Tax Cuts; and, 4) Foreign Aid. Possible scores on this measure range from (-4 / +4). Scores on the measure within the sample range from (-4 / +3), with a mean score of (-0.439). These responses are recoded into three categorical variables ranging from (-4/-2=1 “liberal”) (-1=3 “neutral”) (0/4=2 “conservative”). The Inequality model is meant to capture the effect a general social inequality on individuals

with a *strong* intolerance of inequality. Comparing the effect of intragroup inequality on the cooperation of individuals with a strong intolerance of inequality is meant to provide an additional check of the predictions of the GRH on the utility of liberal ideological orientation. However, as these results are generally consistent with the full Wilson Patterson Model, the results are not discussed here, but are listed in Appendix B.

Statistical Analysis

Results are modelled using standard OLS regression with robust confidence intervals (Hosmer, Lemeshow, Sturdivant 2013, pg. 320). The dependent variable is level of cooperation, which ranges from (0-20). Treatment effects are calculated as a two-way interaction between Treatment and Ideological orientation. Treatment is coded from 1-7, with Treatment 1 “Equality”, coded as the reference category. Orientation is coded from 1-3 with Liberals coded as the reference category. A Lincom function is used to calculate the between and within subject effects for liberals, neutrals, and conservatives in all treatments. Lincom functions are used to compute point estimates, standard errors and p-values for linear combinations of coefficients based on a fitted model. The Lincom command allows for measurement of effects sizes while accounting of initial differences in cooperation observed in the Control condition.

In analyzing the experimental results I consider both the within and between subject effects. Within-subject effects are report the difference in cooperation for individuals with the same ideological orientation between Control and a treatment conditions. Between-subject effects report differences in cooperation for individuals with the different ideological orientations by looking at the change in cooperation between

Control and treatment, for each ideological group, and then comparing these differences. This approach is analogous to a *differences and differences* statistical model.

Prior to the regression the normalcy of the dependent variable (cooperation) is evaluated using a Pearson's coefficient of skewedness. The Pearson's test indicated that there is a skew within the levels of cooperation that could potentially bias the comparison of cooperation between liberals, neutrals, and conservatives. To address the possibility that this skew could impact accuracy of the statistical results I perform a comparison of variance test on the level of cooperation between each ideological category using a Leven's Test of robustness. Based on the study by Conover, Johnson, and Johnson (1981), I focus on the results obtained by substituting the median for the mean, (W_{50} on Table 2). On the Leven's Test, a P-value below ($P > 0.050$) would indicate that the variances of two variables are significantly different from one another. The results of this test (Table 2) indicate that there are no statistically significant differences in the variance of cooperation between liberal and conservative oriented individuals in either the Full Wilson Patterson Index ($P = 0.102$), or Inequality Models ($P = 0.298$). A Breusch-Pagan Test of Heteroskedasticity is also performed on each of the statistical models. The result show that variance of the independent variables in the model is not dependent on the values of the independent variables ($P > 0.6952$) (Table 3).

In addition to the regression by ideological orientation I also present regressions on the interaction between each Treatment and each the "Big 5" personality traits. As mentioned in Chapter 2, personality traits are not only heritable but are strong predictors of liberal-conservative ideological orientation (Gerber et al., 2011). Regressions of the interactions between personality traits and Treatments are included to examine whether certain personality traits, which correlate with ideological orientation, may be disposed to certain kinds of socio-environmental stimuli. Because of the strong correlation between personality and ideology (Table 22), no attempt is made to separate the effect of

personality and ideology in response to Treatment. Instead, I am interested in whether ideology and personality show similar interactions in specific Treatments. Of particular interest is whether Openness to Experience or Conscientiousness show any significant interactions, as these two traits are highly correlated with ideological orientation (Gerber et al., 2011). Cooperation is the dependent variable. Results are calculated as two-way interactions between Treatments and a continuous measure of each personality trait with robust confidence intervals. A total of five models are presented, one for each of the “Big 5” measures. Personality traits are measured using the 10 Factor Model developed by Gosling, Rentfrow, and Swann (2003). Each personality trait is coded on a continuous 12-point scale (Appendix D).

Objectives & Hypotheses

In the following experiment I test whether a general social inequality causes individuals with liberal and conservative ideological orientations to reduce their levels of social cooperation. In doing so, I hope to understand more about the causal mechanism underlying the heritability of different attitudes towards social inequality with respect to the GRH and SRH hypotheses.

This experiment has four objectives; 1) to evaluate the effect of inequality on contributions to a communal goods, 2) to evaluate whether inequality has a disproportionate effect on the cooperation of liberals and/or conservatives, 3) to separate the effect of general inequality on cooperation from the effect of perceptions of social fairness, 4) to evaluate whether the responses of liberals and conservatives to social inequality are consistent with the predictions of the GRH or SRH.

By investigating separately the effect of inequality and the effect of inequality as a function of fairness, I am able to disentangle assumptions of the GRH and SRH regarding the adaptive significance of attitudes towards inequality (Jost 2009; Jost and Amodio 2012; Jost, Federico, and Napier 2009; Smith et al., 2011). If the GRH model is correct, then liberals should be sensitive to the presence of a general inequality within a social group and consequently should show reduced contributions to the communal goods under these social conditions. This condition is summarized in Hypothesis A1, and is tested in Treatments 3 “Low Payout”. Alternatively, if the SRH is correct, then liberals should not be sensitive to a general inequality, but should be strongly sensitive to positive social cues such as the decision of other group members to reduce an inequality. This condition is summarized by Hypothesis B1, and B2 & B3, and is tested in Treatments 3 “Low Payout” and Treatment 4 “Fair Payout”. Furthermore, in accordance with the SRH, conservatives should also not be affected by conditions of general inequality, but should be strongly sensitive to negative social cues that members wish to maintain an existing inequality and show lower levels of cooperation under these conditions. Cooperation in conservatives will also not be affected by positive social cues such as the decision of other group member to correct an existing inequality. This condition is summarized by Hypothesis B4, and is tested in Treatment 5 “Unfair Payout”.

Group Reciprocity Hypothesis (GRH)

Hypothesis A1:

1. Compared with Control conditions, liberal oriented participants will display lower levels of cooperation in social groups in which there is a general inequality.

Hypothesis A2:

2. Compared to conservative oriented participants, liberal oriented participants will be more likely to vote in favour of redistributing resources to remove a general inequality.

Social Risk Hypothesis (SRH)

Hypothesis B1:

3. Compared with Control conditions, cooperation in liberal oriented participants will not be negatively affected by a general inequality.

Hypothesis B2:

4. Compared with Control conditions, cooperation in liberal oriented participants will be positively affected by a positive social cue, the decision of other group members to redistribute the payments equally.

Hypothesis B3:

5. In response to a positive social cue, the decision of other group members to redistribute the payments equally, cooperation in liberal oriented participants will increase in comparison to conservative oriented participants.

Hypothesis B4:

6. Compared with Control conditions, cooperation in conservative oriented participants will be negatively affected by a negative social cue, the decision of other group members not to redistribute the payments equally.

Experimental Results

Summary

Overall the experimental results are more consistent with the predictions of the SRH than the GRH. As predicted by the SRH in Hypothesis B1, in response to conditions of a general inequality in Treatment 2 “High Payout” & Treatment 3 “Low Payout” (Table 7 & Fig 1), no significant differences in cooperation are observed in liberals or conservatives compared to Control. However, as predicted by the SRH in Hypothesis B2, in response to a positive indicator, the decision to redistribute payout in Treatment 4 “Fair Payout”, cooperation in liberals, but not conservatives, significantly increases compared to Control. This effect reaches significance at the 95% confidence level (2.640) ($P=0.011$), (Table 6 & Fig 2-3). Furthermore, as predicted by the SRH in Hypothesis B3, in Treatment 4 “Fair Payout” levels of cooperation in conservatives are significantly lower in comparison to liberals, relative to cooperation in Control Treatment. This effect reaches

significance at the 95% confidence level (-3.454) ($P=0.005$), (Table 7). In fact, in response to Treatment 4 “Fair Payout”, conservatives show a slight decrease in cooperation compared to conservatives in Control Treatment (Table 8). While this decrease failed to reach significance, the result is important for the interpretation of SRH and will be further addressed in the discussion section of this chapter.

Looking at the within subject effects, no significant positive effects are observed in conservatives in response to any Treatment (Table 8 & Fig 3). In Treatment 6, “Redistribution,” cooperation in liberals, but not conservatives, significantly increases in comparison to Control. This effect reaches significance at the 95% confidence level (2.132) ($P=0.031$), (Table 8 & Fig 2). Similarly, as predicted by the SRH in Hypothesis B4, in response to a negative indicator in Treatment 5 “Unfair Payout”, the decisions of high payout participants not to redistribute, cooperation in conservatives significantly decreases as compared to Control. This effect is significant at the 95% confidence level (-3.158) ($P=0.005$), (Table 8 & 3). In response to Treatment 5, cooperation in liberals is also significantly lower; this effect reaches significance at the 95% confidence level (-2.458) ($P=0.025$), (Table 8 & Fig 2). Below, I present a detailed breakdown of all Treatment effects.

Fig 1:

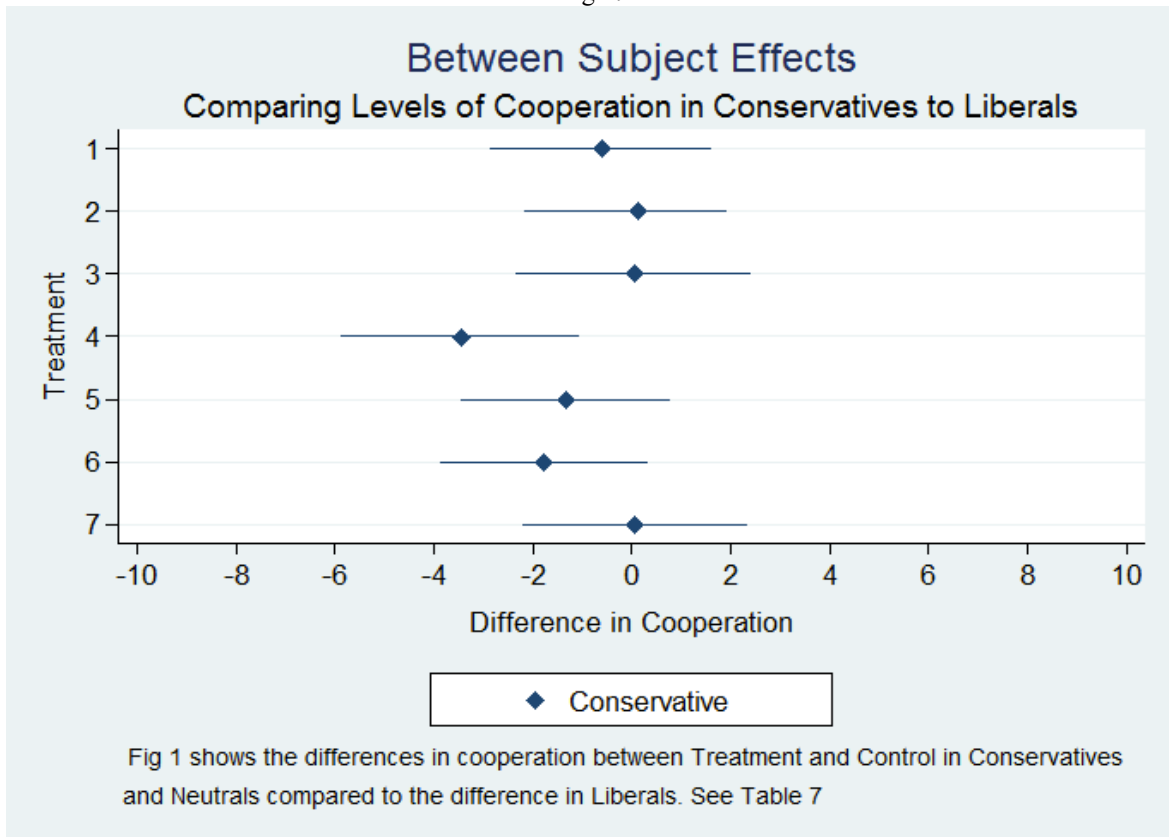


Fig 2:

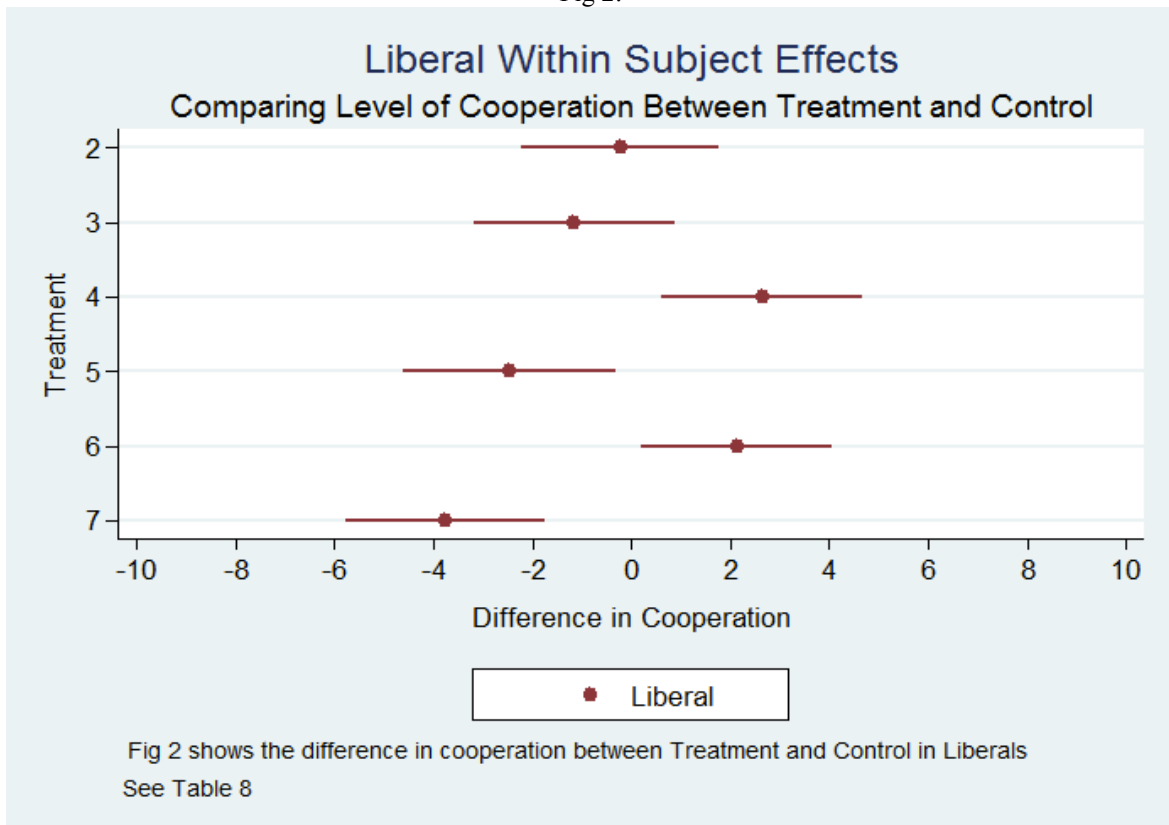


Fig 3:

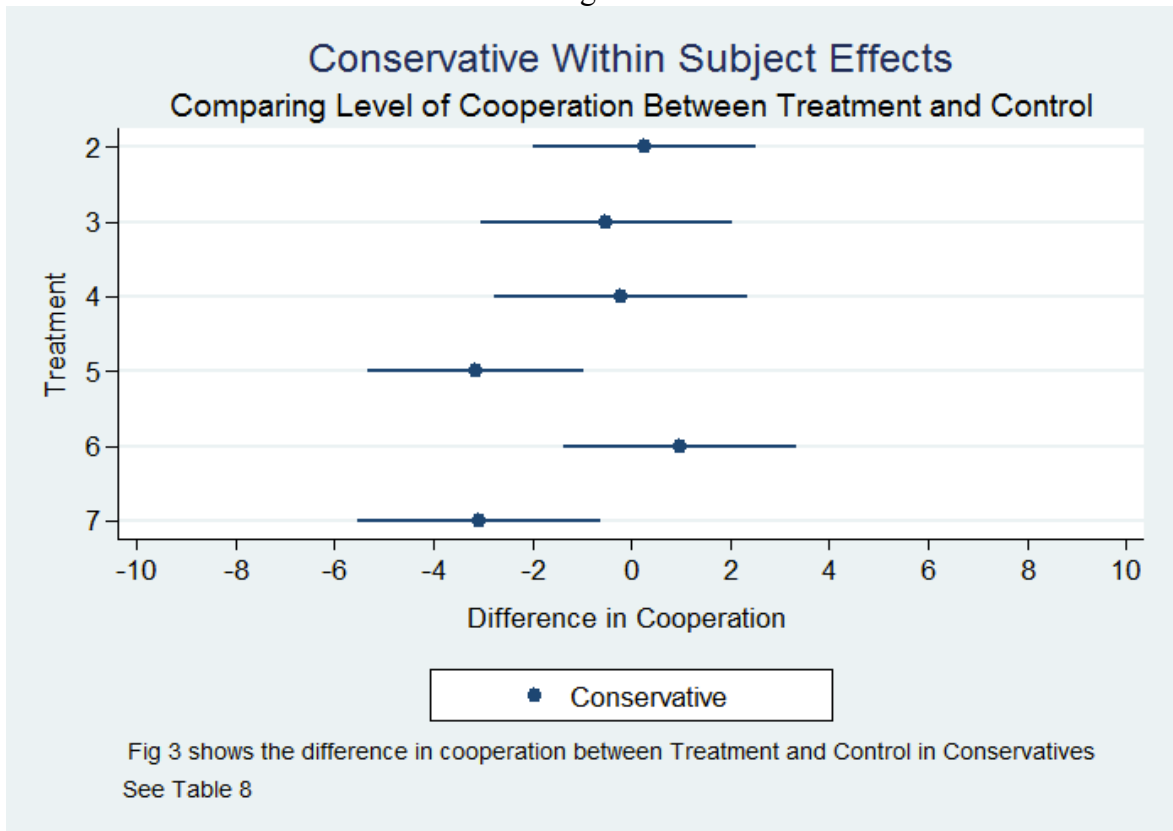
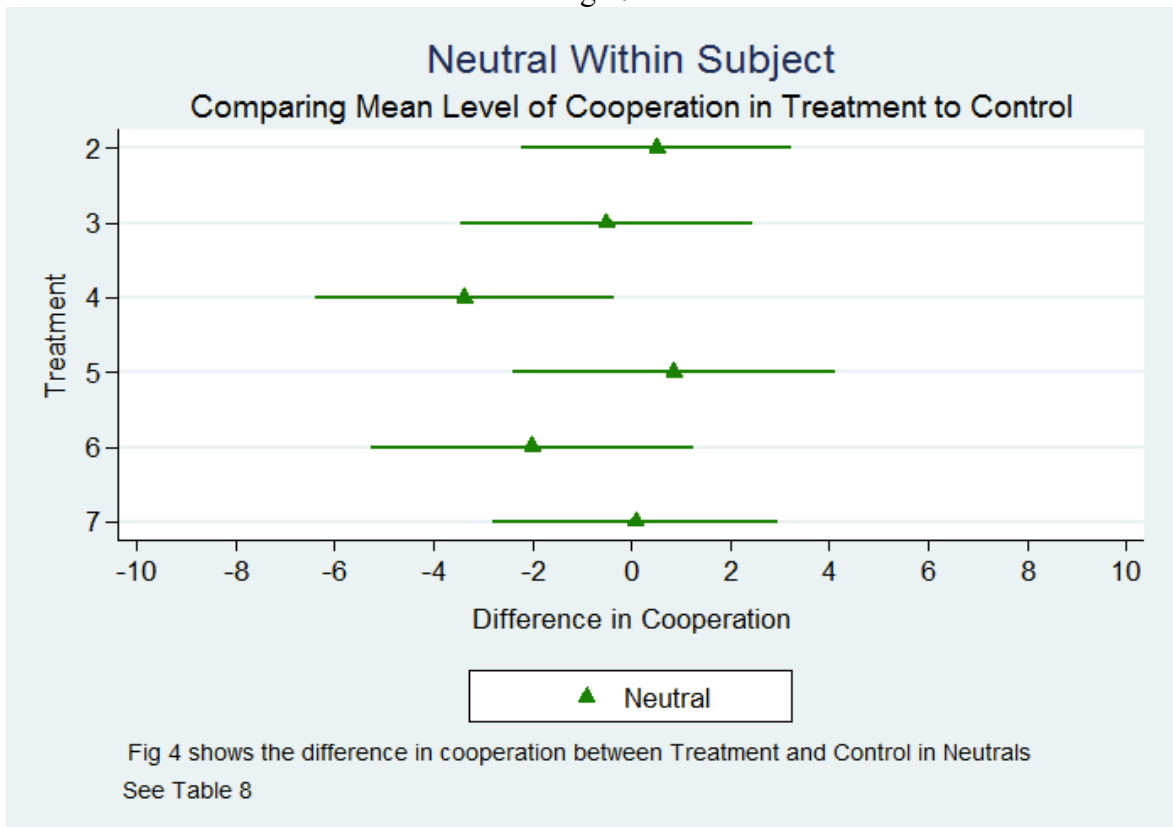


Fig 4:



Overall Model

Looking at the statistical results without differentiation by ideological orientation (Table 4), significant effects are observed in Treatments 5, 6, and 7. In Treatment 5 “Unfair Payout” and Treatment 7 “No Redistribution” overall levels of cooperation are lower in comparison to Control “Equal Payout” Treatment. These effects reach significance at the 99% confidence level; Treatment 5 (-2.607) ($P=0.000$), Treatment 7 (-2.607) ($P=0.000$). In Treatment 6 “Redistribution” levels of cooperation are higher compared to Control. This effect reaches significance at the 95% confidence level (1.509) ($P=0.035$). Additionally, in Treatment 4 “Fair Payout” levels of cooperation show a positive trend relative to Control; however, this effect failed to reach significance (1.211) ($P=0.111$).

Looking at the effect of combined treatments, Treatments 2&3, 4&6, 5&7, a positive effect is observed in Treatments 4&6 “Fair Payout & Redistribution”, and a negative effect is observed in Treatments 5&7 “Unfair Payout & No Redistribution” (Table 5). These effects reach significance at the 95% and the 99% confidence level; Treatment 4&6 (1.333) ($P=0.033$), Treatment 5&7 (-3.052) ($P=0.000$)

Wilson Patterson Models: Between Subject Effects

Grouping participants by ideological orientation on the Wilson-Patterson Index produces a number of significant interactions between political orientation and Treatment (Tables 6 -12). Beginning with the between subject effects, as predicted by the SRH, cooperation between liberals and conservatives are significantly different in Treatment 4 “Fair Payout”, with conservatives showing lower levels of cooperation than liberals

relative to cooperation in Control Treatment (Table 7). This effect reaches significance at the 95% confidence level, (-3.454) ($P=0.005$). Consequently for *Hypothesis B3 I reject null*. In Treatment 6 “Redistribution”, in comparison to liberals, conservatives show significantly lower levels of cooperation relative to cooperation in Control Treatment (Table 7). This effect reaches significance at the 90% confidence level (-1.764) ($P=0.099$).

Turning to the between effects of combined treatments, Treatments 2&3, 4&6, 5&7 (Table 10), no significant differences in cooperation are observed between liberals, neutrals, and conservatives. Though in Treatments 4&6 “Fair Payout & Redistribution” cooperation in liberals shows strong positive trends in comparison to conservatives and neutrals, these trends fail to reach significance; ($P=0.153$), ($P=0.123$).

Within Subject Effects

Looking at the within subject effects (Table 8), levels of cooperation in liberals is significantly different from Control in Treatments 4, 5, 6 and 7. In Treatments 4 “Fair Payout” & 6 “Redistribution” levels of cooperation increased compared to Control (Table 8). These effects reach significance at the 95% confidence level; Treatment 4 (2.640) ($P=0.011$), Treatment 6 (2.132) ($P=0.031$). Consequently, for *Hypothesis B2 I reject null*. In Treatments 5 “Unfair Payout” & 7 “No Redistribution” levels of cooperation in liberals decreased compared to Control (Table 8). These effects reach significance at the 95% confidence level; Treatment 5 (-2.458) ($P=0.025$), Treatment 6 (-3.766) ($P=0.000$).

Looking at conservative oriented participants, levels of cooperation are significantly lower in Treatments 5 “Unfair” & Treatment 7 “No Redistribution” in comparison to Control (Table 8). These effects reach significance at the 95% confidence

level; Treatment 5 (-3.158) ($P=0.005$), Treatment 7 (-3.077) ($P=0.014$). Consequently, for *Hypothesis B4*, I reject null.

Neutral oriented participants also show significantly lower levels of cooperation in Treatment 7 “No Redistribution” compared to Control (Table 8). This effect reaches significance at the 95% confidence level (-3.933) ($P=0.038$).

Looking at the within subject effects for the combined treatments, Treatments 2&3, 4&6 and 5&7, cooperation in liberal oriented participants is higher in Treatments 4&6 “Fair Payout & Redistribution” and lower in Treatments 5&7 “Unfair Payout and No Redistribution” in comparison to Control (Table 11). These effects reach significance at the 95% and 99% confidence levels; Treatments 4&6 (4.772) ($P=0.007$), Treatments 5&7 (-6.224) ($P=0.001$). However, cooperation in Treatments 2&3 “High & Low Payout” is not significantly different from Control. Consequently, as cooperation in liberals in Treatments 2, 3, or 2&3 is not significantly different from Control for *Hypothesis A1*, I fail to reject the null, and for *Hypothesis B1* I reject null.

In conservative participants, cooperation is significantly lower in Treatments 5&7 in comparison to Control (Table 11). This effect reaches significance at the 95% confidence level (-6.235) ($P=0.003$). In neutral oriented participants cooperation in Treatments 5&7 is also lower relative to Control (Table 11). This effect reaches significance at the 90% confidence level (-5.784) ($P=0.088$).

Decision to Redistribute

Looking at the decision to redistribute participant's payouts, Treatment 6 "Redistribution" & Treatment 7 "No Redistribution", Table 9 shows the difference in predicted probability to redistribute or not to redistribute the payouts (0=Yes, redistribute) (1=No, do not redistribute). The results show that there are no significant differences between the probability of liberals and conservatives redistributing the payouts. Consequently for *Hypothesis A2*, I fail to reject the null. Between liberals and neutrals, neutrals are significantly more likely *not* to redistribute payments than liberals. This effect reaches significances at the 95% confidence level, (0.668) ($P=0.039$).

Discussion

Overall, the results are consistent the predictions of the SRH supporting the argument that differences in ideological orientation may be linked to differences in the sensitivity and responsiveness of individuals to socio-environmental stimuli. As expected, neither liberals nor conservatives show differences in cooperation in response to a general social inequality. However, in response to knowledge that group members voted to redress this inequality, levels of cooperation in liberals, but not conservatives, significantly increases in comparison to Control. Moreover, cooperation in liberals in response to the decision to redress the inequality is also significantly higher in comparison to conservatives. In response to knowledge that group members did not vote to rectify an existing inequality, levels of cooperation in both liberals and conservatives are significantly lower in comparison to Control. No significant difference between liberals and conservatives is observed in response to the decision to maintain the inequality.

Taken together, the difference in responsiveness of liberals and conservatives to social cues about the decision to redistribute payments is highly significant to the argument that ideological differences are a product of alternative strategies for social interaction, as the variation in behavioural responses provides the basis for frequency dependent selection. Recall that frequency dependent strategies are strategies whose utility is dependent on the distribution of similar and dissimilar behaviours within the surrounding environment. While cooperation in liberal participants increases in Treatment 4 “Fair Payout”, in response to the redistribution of payouts, this increase is not necessarily beneficial. Instead, the utility of this behaviour depends on how many other individuals within the social group also increase their cooperation. If the majority of participants do not increase their cooperation, as in the case of conservative participants in Treatment 4 “Fair Payout”, then the increases in cooperation of liberals will have a detrimental, rather than beneficial, effect on their individual utility. Similarly, being less responsive to a signal to cooperation, such as in Experiment 1, would be detrimental to an individual’s utility if this signal is genuine in its intentions, and if other individuals within your environment are able to disproportionately benefit from the opportunity.

The fact that assorting participants by ideological orientation produces groups with distinct behavioural responses to socio-environmental cues, and that these cues are *influential* on social outcomes strongly supports the interpretation of the SRH that ideological differences: 1) may be the product of selection over the course of human evolution; and, 2) may represent adaptations for a number of socio-environmental conditions. However, before the full argument can be made about the potential adaptive significance of liberal-conservative differences it is important to consider the result of Experiment 3 on the effects of normative disagreement on cooperation within a social group. Additionally, it is also worth noting that, unlike in Experiment 1, liberal oriented

participants show significantly lower levels of cooperation in response to negative cues. This is important, as the argument of the SRH is that ideological differences reflect differences in the *sensitivity* to positive and negative stimuli and not that liberal oriented individuals are incapable of experiencing negative social effects. Here, sensitivity refers to both the nature of the stimuli that elicit behaviour changes, or the intensity of the stimuli that is required to produce a change in behaviour.

Treatment Affects by Personality Traits

In evaluating the effect of personality and cooperation I focus on the within subject effects and whether the effect of personality in each treatment is significantly different from Control. Table 27 shows the correlations between scores on the Wilson-Patterson and personality traits. These results show that there are significant correlations between ideological orientation and personality. Looking at the results, there is a strong negative correlation between increasing scores on the Wilson-Patterson Index and Openness to Experience (-0.627) ($P=0.000$). Additionally, there are positive correlations are observed between increasing score on the Wilson-Patterson Index and Extraversion (0.248) ($P=0.000$), Conscientiousness (0.632) ($P=0.000$), and Agreeableness (0.219) ($P=0.022$).

Looking at the interaction between personality traits and Treatments, only two personality traits show a significant effect, Conscientiousness and Agreeableness (Table 20 & 23). In Treatments 2, 4 and 6, there is a significant interaction between Conscientiousness and Cooperation. In Treatment 2, “High Payout”, Conscientious individuals show higher levels of cooperation in comparison to Control (Table 20). This effect reaches significance at the 90% confidence level (0.369) ($P=0.055$). In Treatments 4 “Fair Payout” and Treatment 6, “Redistribution”, Conscientious individuals show lower

levels of cooperation relative to Control (Table 17). These effects reach significance at the 90% and 95% confidence levels; Treatment 4 (-0.403) ($P=0.086$), Treatment 6 (-0.426) ($P=0.018$). There is also a significant negative interaction between Agreeableness and Cooperation in Treatment 1 Control “Equal Payout”. This effect reaches significance at the 90% confidence level, (-0.407) ($P=0.086$) (Table 23).

The observation that Conscientious individuals display higher levels of cooperation in response to receiving a “High Payout” in Treatment 2, but lower cooperation in response to receiving a “Fair Payout” in Treatment 4, or their own decision to “Redistribute” payouts in Treatment 6, is interesting. In particular, because the result appears contrary to social intuitions that cooperation should increase in response to a cue that other group members prefer a more egalitarian cooperative environment. Equally stimulating is that Conscientious individuals feel obligated to contribute more to a social group when they are in an advantageous or dominant social position, such as in Treatment 2 “High Payout”, but not in Treatment 4 “Fair Payout” when they are disadvantageous or socially dependent position. In this respect the decision to redress an inequality does not constitute, for Conscientious individuals, a positive cue which increases their willingness to bear a social risk. In keeping with the characteristic concern for correct behaviour, the results of Treatment 2, 4 & 6 suggest that one possible explanation for the observed by behaviour of Conscientious individuals is that Conscientious individuals feel a greater sense of obligation to contribute to the communal goods in environments where they receive an advantage such as Treatment 2 “High Payout”, however, this sense of obligation is fulfilled in Treatment 6 “Redistribution” by the decision to redistribute payouts fairly to all participants. Less clear however, is why cooperation in Conscientious individuals in Treatment 4 “Fair Payout” remains significantly lower after their payouts are redistributed?

To better understand this behaviour of liberal and conservative oriented individuals it is worth revisiting the findings of Schreiber et al., (2013). Schreiber et al, find that during risky decision-making the cognitive activity in liberal oriented individuals increased in the brain areas associated with the monitoring of internal subjective feelings states, while the cognitive activity of conservative individuals increased in the areas associated with the monitoring of external threats (Schreiber et al., 2013). In this light, if the decision to redistribute payments is accompanied by a positive emotional cue, such as a sense of reward, it makes sense that liberal oriented individuals would increase their cooperation. Similarly, social environments in which there is presently, or has recently been, an inequality, may not appear to be less threatening than egalitarian environments as these conditions create the possibility for selfish or jealous behaviours in other social actors. Assuming a strong correlation between conservatism and Conscientiousness, this may contribute to the lower levels of cooperation observed in both groups in Treatment 4 “Fair Payout” and Treatment 6 “Redistribute”. In this view it is possible that Conscientious and/or, conservative individuals are viewing the decision to redistribute the payouts to the group and the decision on how much to cooperation with the group as separate social actions. That is, they may feel obligated to redistribute payments due to some norm of social fairness but this decision may not increase their willingness to bear social risks as the prior inequality may have created conditions in which other actors may behave more competitively or selfishly towards others.

Tables

Table 1: Correlations Between the 20 point Wilson Patterson Index and Self-Report Liberal-Conservative Ideological Orientation on a 7-point Likert Scale.

Ideology	Coef..	Std.	P> z	Conf Int.
Liberal-Conservative	.182	.004	0.000	0.174 0.191
cons	4.387	.036	0.000	4.316 4.457

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 2: Leven's Robustness Test Comparing the Variance in Cooperation Between Liberals, Neutrals, and Conservatives Based on the Wilson Patterson Index

WorksCat	Mean	Std.	Freq.
Liberal	9.490	7.088	631
Conservative	8.320	6.767	198
Neutrals	8.652	7.456	198
Totals	8.965	7.058	1245
W0	2.611	df (1, 1242)	Pr > F= 0.074
W50	2.284	df (1,1242)	Pr > F= 0.102
W10	2.611	df(1, 1242)	Pr > F= 0.074

P >0.05* Denotes Significance

Table 3: Breusch-Pagan Test of Heteroskedasticity. Full Wilson Patterson Model.

Variables	Treatment*Attitudes
Chi2 (20)	16.34
Prob > Chi2	0.6952

P >0.05* Denotes Significance

Table 4: Overall Levels of Cooperation in each Treatment Compared to Control.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.034	.706	0.961	-1.420 1.351
Treatment 3	-1.056	.741	0.154	-2.509 .397
Treatment 4	1.211	.758	0.111	-.277 2.699
Treatment 5	-2.607	.739	0.000***	-4.056 -1.158
Treatment 6	1.509	.715	0.035**	.107 2.912
Treatment 7	-3.558	.522	0.000***	-4.990 -2.125
cons	9.545	.521	0.000	8.522 10.568

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 5: Levels of Trust in Combined Treatments Compared to Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2&3	-.542	.630	0.390	-1.779 .695
Treatment 4&6	1.362	.637	0.033**	.111 2.612
Treatment 5&7	-3.052	.637	0.000***	-4.303 -1.802

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 6: Linear Regression of Cooperation in each Treatment Based on Score on the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.225	1.023	0.826	-2.232 1.782
Treatment 3	-1.163	1.034	0.261	-3.191 0.865
Treatment 4	2.640	1.040	0.011**	0.599 4.680
Treatment 5	-2.458	1.098	0.025**	-4.612 -0.304
Treatment 6	2.132	0.987	0.031**	0.196 4.067
Treatment 7	-3.766	1.025	0.000**	-5.778 -1.755
WP Conservative	-.618	1.133	0.586	-2.840 1.605
WP Neutral	.254	1.577	0.872	-2.839 3.348
T2 Cat 2	.496	1.540	0.748	-2.526 3.517
T2 Cat 3	.256	2.101	0.903	-3.866 4.379
T3 Cat 2	.660	1.655	0.690	-2.597 3.906
T3 Cat 3	-.768	2.178	0.724	-5.041 3.504
T4 Cat 2	-2.837	1.669	0.089	-6.110 0.437
T4 Cat 3	-3.638	2.203	0.099	-7.960 0.684
T5 Cat 2	-.700	1.562	0.654	-3.765 2.364
T5 Cat 3	.607	2.291	0.791	-3.888 5.101
T6 Cat 2	-1.147	1.557	0.462	-4.202 1.908
T6 Cat 3	-2.259	2.287	0.324	-6.745 2.228
T7 Cat 2	.689	1.619	0.671	-2.488 3.866
T7 Cat 3	-.167	2.153	0.938	-4.391 4.058
cons	9.714	0.747	0.000	8.249 11.180

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 7: Between Subject Effects. Wilson-Patterson Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservative	-.617	1.133	0.586	-2.840 1.605
T2. Conservative	.122	1.044	0.907	-2.169 1.926
T3. Conservative	.042	1.206	0.972	-2.324 2.409
T4. Conservative	-3.454	1.225	0.005**	-5.858 -1.050
T5. Conservative	-1.318	1.076	0.221	-3.429 0.793
T6. Conservative	-1.764	1.069	0.099*	-3.861 0.332
T7. Conservative	.072	1.157	0.951	-2.199 2.342
T1. Neutral	.254	1.577	0.872	-2.839 3.348
T2. Neutral	.511	1.389	0.713	-2.215 3.236
T3. Neutral	-.514	1.502	0.732	-3.461 2.433
T4. Neutral	-3.384	1.538	0.028**	-6.402 -0.365
T5. Neutral	.861	1.662	0.604	-2.400 4.122
T6. Neutral	-2.004	1.657	0.227	-5.254 1.246
T7. Neutral	.088	1.466	0.952	-2.789 2.964

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 8: Within Subject Effects. Wilson-Patterson Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2. Liberal	-.225	1.023	0.826	-2.232 1.782
T3. Liberal	-1.163	1.034	0.261	-3.191 0.865
T4. Liberal	2.640	1.040	0.0011**	0.599 4.680
T5. Liberal	-2.458	1.098	0.025**	-4.612 -0.304
T6. Liberal	2.132	0.987	0.031**	0.196 4.067
T7. Liberal	-3.766	1.025	0.000**	-5.778 -1.755
T2. Conservative	.271	1.151	0.814	-1.988 2.530
T3. Conservative	-.504	1.292	0.697	-3.039 2.032
T4. Conservative	-.197	1.305	0.880	-2.757 2.363
T5. Conservative	-3.158	1.111	0.005**	-5.339 -0.978
T6. Conservative	.985	1.205	0.414	-1.379 3.350
T7. Conservative	-3.077	1.253	0.014**	-5.536 -0.618
T2. Neutral	.031	1.835	0.986	-3.570 3.632
T3. Neutral	-1.032	1.917	0.314	-5.692 1.829
T4. Neutral	-.998	1.942	0.607	-4.808 2.812
T5. Neutral	-1.851	2.011	0.357	-5.796 2.094
T6. Neutral	-.127	2.063	0.951	-4.174 3.921
T7. Neutral	-3.933	1.893	0.038**	-7.648 -0.218

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 9: Logistic Regression Comparing the Probability of Voting to Redistribute Participant Payouts Between Liberals, Neutrals, and Conservatives. Orientation is Based on the Full Wilson-Patterson Scale. 1= Not Redistribute, 0=Redistribute. Liberals are Coded as the Reference Category.

Redistribute	Prob.	Std.	P> z	Conf Int.
Conservative	.122	0.242	0.616	-0.354 0.597
Neutral	.668	0.334	0.039**	0.035 1.342
cons	-.301	0.151	0.046	-0.596 -0.005

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 10: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 Control Treatment by Political Orientation Across the Wilson-Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
WP Lib vs. Con T 2 & 3	-1.156	2.771	0.677	-6.591 4.280
WP Lib vs. Neut T2 & 3	.512	3.759	0.892	-6.862 7.887
WP Con vs Neut T 2 & 3	1.668	3.917	0.670	-6.017 9.353
WP Lib vs. Con T 4 & 6	3.983	2.788	0.153	1.487 9.454
WP Lib vs. Neut T 4 & 6	5.897	3.880	0.129	-1.716 13.509
WP Con vs Neut T 4 & 6	1.913	4.061	0.638	-6.053 9.880
WP Lib vs. Con T 5 & 7	.011	2.762	0.997	-5.407 5.430
WP Lib vs. Neut T 5 & 7	-.440	3.854	0.909	-8.002 7.122
WP Con vs Neut T 5 & 7	-.451	3.967	0.909	-8.235 7.332

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 11: Within Subject Effects: Comparing Levels of Cooperation in Combined Treatments for Liberals, Neutrals, Conservatives Across the Wilson-Patterson Index, Relative to Control.

Treatment	Coef.	Std. Err	P> z	Conf Int
WP Lib T2 & T3	-1.388	1.797	0.440	-4.915 2.138
WP Con T2 & T3	-.233	2.108	0.912	-4.369 3.904
WP Neut T2 & T3	-1.900	3.301	0.565	-8.377 4.576
WP Lib T4 & T6	4.772	1.781	0.007**	1.278 8.265
WP Con T4 & T6	.788	2.146	0.713	-3.421 4.998
WP Neut T4 & T6	-1.125	3.447	0.744	-7.888 5.639
WP Lib T5 & T7	-6.224	1.837	0.001***	-9.827 -2.621
WP Con T5 & T7	-6.235	2.063	0.003**	-10.283 -2.188
WP Neut T5 & T7	-5.784	3.389	0.088*	-12.433 0.864

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 12: Linear Regression of the Interaction Between Treatment and Extraversion on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-1.057	1.651	0.522	-4.297 2.183
Treatment 3	-3.638	1.753	0.038	-7.076 -0.200
Treatment 4	.609	1.765	0.730	-2.854 4.072
Treatment 5	-3.308	1.747	0.058	-6.734 -0.119
Treatment 6	1.951	1.687	0.248	-1.358 5.260
Treatment 7	-3.617	1.627	0.026	-6.809 -0.425
Extra	-0.157	0.156	0.314	-0.463 0.149
T2 Extra	0.140	0.211	0.508	-0.247 0.554
T3 Extra	0.352	0.217	0.104	-0.073 0.777
T4 Extra	0.080	0.225	0.723	-0.362 0.522
T5 Extra	0.093	0.226	0.682	-0.351 0.537
T6 Extra	-.078	0.219	0.723	-0.507 0.625
T7 Extra	-0.008	0.208	0.970	-0.416 0.400
cons	10.688	1.221	0.000	8.293 13.083

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 13: Effect of Extraversion on Cooperation in each Treatment Compared to Extraverts in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.157	0.156	0.314	-0.463 0.149
Treatment 2	-.017	0.142	0.903	-0.296 0.261
Treatment 3	.195	0.150	0.194	-0.100 0.490
Treatment 4	-.077	0.162	0.634	-0.396 0.241
Treatment 5	-.064	0.164	0.694	-0.386 0.257
Treatment 6	-.235	0.154	0.126	-0.536 0.066
Treatment 7	-.165	0.138	0.231	-0.435 0.105

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 14: Linear Regression of the Interaction Between Treatment and Openness to Experience on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	2.664	2.943	0.365	-3.109 8.437
Treatment 3	.712	3.112	0.819	-5.395 6.818
Treatment 4	2.085	2.944	0.479	-3.691 7.862
Treatment 5	-2.347	2.791	0.442	-8.086 3.391
Treatment 6	5.628	2.791	0.044	0.152 11.103
Treatment 7	-.752	2.931	0.798	-6.502 4.999
Open	.259	0.201	0.197	-0.135 0.653
T2 Open	-.272	0.284	0.339	-0.829 0.286
T3 Open	-.179	0.304	0.556	-0.776 0.418
T4 Open	-.088	0.290	0.763	-0.658 0.482
T5 Open	-.024	0.294	0.935	-0.601 0.553
T6 Open	-.416	0.276	0.132	-0.957 0.125
T7 Open	-.283	0.291	0.330	-0.854 0.287
cons	6.975	2.020	0.001	3.011 10.939

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 15: Effect of Openness on Cooperation in each Treatment Compared to Openness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.259	0.201	0.197	-0.135 0.653
Treatment 2	-.013	0.201	0.950	-0.407 0.382
Treatment 3	.080	0.229	0.726	-0.368 0.528
Treatment 4	.171	0.210	0.414	-0.240 0.583
Treatment 5	.235	0.215	0.274	-0.187 0.657
Treatment 6	-.157	0.189	0.406	-0.527 0.214
Treatment 7	-.024	0.210	0.908	-0.436 0.388

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 16: Linear Regression of the Interaction Between Treatment and Conscientiousness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int	
Treatment 2	-6.726	3.179	0.035	-12.962	-0.489
Treatment 3	-1.996	3.553	0.574	-8.967	4.974
Treatment 4	3.109	3.520	0.377	-3.797	10.015
Treatment 5	-7.021	3.348	0.036	-13.590	-0.453
Treatment 6	3.472	3.049	0.255	-2.510	9.455
Treatment 7	-6.193	3.241	0.056	-12.551	0.165
Consc	-.233	0.209	0.266	-0.643	0.178
T2 Consc	.601	0.284	0.034	0.045	1.158
T3 Consc	.087	0.315	0.782	-0.531	0.705
T4 Consc	-.170	0.314	0.588	-0.787	0.446
T5 Consc	.401	0.306	0.190	-0.199	1.001
T6 Consc	-.194	0.276	0.483	-0.736	0.348
T7 Consc	-.239	0.294	0.417	-0.338	0.816
cons	12.110	2.302	0.000	7.594	16.626

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 17: Effect of Conscientiousness on Cooperation in each Treatment Compared to Conscientiousness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int	
Treatment 1	-.233	0.209	0.266	-0.643	0.178
Treatment 2	.369	0.192	0.055*	-0.007	0.745
Treatment 3	-.145	0.236	0.537	-0.608	0.317
Treatment 4	-.403	0.234	0.086*	-0.863	0.057
Treatment 5	.168	0.223	0.452	-0.270	0.606
Treatment 6	-.426	0.181	0.018**	-0.781	-0.072
Treatment 7	.006	0.207	0.976	-0.400	0.412

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 18: Linear Regression of the Interaction between Treatment and Agreeableness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-4.971	3.470	0.152	-11.779 1.837
Treatment 3	-5.543	3.553	0.119	-12.513 1.427
Treatment 4	-.659	3.623	0.856	-7.767 6.449
Treatment 5	-7.337	3.629	0.043	-14.456 -0.218
Treatment 6	-.958	3.377	0.777	-7.584 5.667
Treatment 7	-9.272	3.452	0.007	-16.044 -2.500
Agreeability	-.407	0.176	0.086	-0.871 0.058
T2 Agreeability	.455	0.307	0.139	-0.148 1.057
T3 Agreeability	.413	0.320	0.198	-0.215 1.040
T4 Agreeability	.163	0.330	0.621	-0.484 0.810
T5 Agreeability	.435	0.326	0.182	-0.204 1.075
T6 Agreeability	.217	0.307	0.480	-0.386 0.820
T7 Agreeability	.531	0.313	0.090	-0.083 1.145
cons	13.970	2.670	0.000	8.731 19.209

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 19: Effect of Agreeableness on Cooperation in each Treatment Compared to Agreeableness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.407	0.237	0.086*	-0.871 0.058
Treatment 2	.048	0.196	0.806	-0.336 0.432
Treatment 3	.006	0.215	0.978	-0.417 0.429
Treatment 4	-.244	0.230	0.289	-0.695 0.207
Treatment 5	.029	0.224	0.898	-0.411 0.469
Treatment 6	-.189	0.196	0.335	-0.575 0.196
Treatment 7	.124	0.205	0.544	-0.278 0.527

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 20: Linear Regression of the Interaction between Treatment and Emotional Stability on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.057	2.553	0.967	-4.903 5.114
Treatment 3	-.227	2.518	0.928	-5.166 4.713
Treatment 4	4.824	2.549	0.059	-0.176 9.825
Treatment 5	-.060	2.781	0.983	-5.516 5.395
Treatment 6	3.686	2.353	0.118	-.931 8.304
Treatment 7	.028	2.358	0.990	-4.598 4.655
Emotion Stability	.261	0.176	0.137	-0.083 0.606
T2 Emotion Stability	-.023	0.247	0.925	-0.507 0.461
T3 Emotion Stability	-.083	0.251	0.741	-0.575 0.409
T4 Emotion Stability	-.366	0.255	0.152	-0.865 0.134
T5 Emotion Stability	-.257	0.278	0.355	-0.803 0.288
T6 Emotion Stability	-.219	0.234	0.349	-0.678 0.240
T7 Emotion Stability	-.359	0.230	0.119	-0.812 0.093
cons	6.957	1.759	0.000	3.507 10.407

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 21: Effect of Emotional Stability on Cooperation in each Treatment Compared to Emotional Stability in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.262	0.176	0.137	-0.083 0.606
Treatment 2	.238	0.173	0.170	-0.102 0.578
Treatment 3	.179	0.179	0.318	-0.172 0.530
Treatment 4	-.104	0.185	0.573	-0.466 0.258
Treatment 5	.004	0.215	0.984	-0.419 0.427
Treatment 6	.042	0.154	0.784	-0.261 0.345
Treatment 7	-.098	0.149	0.512	-0.391 0.195

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 22: Correlations Between Wilson-Patterson Index and the "Big 5" Personality Traits. Higher Scores on the WP are Associated with a Conservative Ideological Orientation.

Personality	Coef.	Std. Err	P> z	Conf Int
Openness	-.627	.089	0.000***	-0.801 -0.454
Extraversion	.248	.066	0.000***	0.118 0.378
Conscientiousness	.632	.099	0.000***	0.438 0.825
Agree	.219	.096	0.022**	0.031 0.406
Emotion Stability	.156	.084	0.064**	-0.009 0.321
Cons	-8.585	1.295	0.000	-11.126 -6.044

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Chapter Five: Experiment Three

Effect of Normative Disagreement on Cooperative Behaviour in Social Groups

In Experiment 1, I tested how attitudes towards the tolerance/intolerance of social change and inequality affect the willingness of liberal and conservative oriented individuals to trust an anonymous social partner. In Experiment 2, I more closely examined the predictions of the GRH and SRH by focusing on the relationship between attitudes towards the intolerance of inequality and the effect of a real inequality on the cooperative behaviour of individuals with these attitudes. In this third experiment, I continue to evaluate the predictions of the GRH and SRH by focusing on the relationship between different attitudes towards social change, structure and stability and the effect of real conditions of social change and instability on the cooperative behaviour of individuals with these attitudes.

The goal of this experiment is to further develop the results of Experiment 1 regarding the adaptive utility of different social attitudes associated with liberal and conservative ideological orientations. In particular, I seek to evaluate the expectations of the GRH that conservative preferences for socially stable and structured environments contribute to individual utility by increasing the absolute level of reciprocity within a social group. To capture the effect of social change and instability on group cooperation I use agreement and disagreement about social norms as a proxy for a changing or unstable social environment.⁴⁰ By focusing on the effects of normative agreement and disagreement on social interaction I am able to more closely control the social cues individuals receive

⁴⁰ Research shows that descriptive norms, which define shared beliefs as well as the expectations of others, play an important role in the creation of group structure and identity as well as in the maintenance and expression of cooperative and coordinated actions within a social group. Shared social norms are an important factor in constructing group identity and can provide cues about the loyalty or trustworthiness of other individuals (Cialdini and Goldstein 2004; Peterson 2009; Sosis 2000; Sosis and Bressler 2003).

prior to a social interaction than I am in Experiment 1 using the implicit attitude measure. In manipulating social structure and stability, I utilize a set of general social norms as opposed to socio-political attitudes to better control for differences associated with ideological orientation and to rule out possible confounding effects associated with group identification.

Based on the hypothesis of the GRH that conservative attitudes for stable and structured social environments are based on an adaptive strategy to increase reciprocity, the goal of this experiment is to observe whether cooperative behaviour in conservative oriented individuals is responsive to social environments that are highly uniform in their perspective about appropriate social behaviour. Accordingly, if the GRH is correct then conservative, but not liberal, oriented individuals should show increases in levels of cooperation when assigned to groups in which they share a strong normative perspective with a clear majority of group members. Alternatively, if the SRH is correct, and both liberal and conservative behavioural differences are a product of strategies to avoid socio-environmental risk, then cooperation in conservative oriented individuals should not be positively affected by the presence of a strong-shared normative perspective. However, according to the SRH, cooperation in conservative oriented individuals will be negatively affected in social groups in which the majority of participants approve of a perceived normative violation.

Experimental Methods

Communal Goods Game

The experimental interaction is based on a standard communal goods game. Participants are randomly assigned into groups of five and are awarded 20 tokens. Participants may allocate between 0-20 tokens to the communal good. Every token allocated to the communal good is multiplied by 1.3x. The total number of tokens allocated is then divided by the number of players in the group and added to each player's remaining tokens. Players earn real money (\$0.10) in \$US for each token they have at the end of the game. Most players completed the study in less than 20 minutes. A 1.3x multiplier is smaller than the multiplier used in Experiment 2. This smaller multiplier is a deliberate decision on the part of the experimenter to better capture the sensitivity of liberal and conservative oriented participants to the effect of normative agreement and disagreement by reducing the initial incentive for individual participants to cooperate. Drawing from mismatch theory, the reasoning behind this change is that, if conservative preferences for stable and structured environments are based on dispositions to increase the absolute the level of reciprocity, then the presence of shared group norms should trigger their desire to cooperate with the social group (Van Vugt et al., 2008; Van Vugt et al., 2008).⁴¹ Similarly, lowering the return per token also lowers incentives for participants to initially contribute to the communal good. Consequently, this approach also increases the significance of observing whether normative disagreement has a negative effect on cooperation relative to the Control group. The size of the cooperative group is also reduced

⁴¹ The idea behind mismatch theory is that traits, which were adaptive under a different set of historical environmental conditions may lead to unintended or even maladaptive outcomes under the unique conditions of the contemporary environment. Dispositions to cooperate in stable, structured, or cohesive social groups may have been evolutionarily advantageous in past environments where; 1) individuals are highly related (inclusive fitness), or 2) levels of reciprocity within a group are high. However, in today's social groups, which are less socially cohesive, these traits may lead to greater risk of exploitation (Van Vugt et al., 2008, pg. 191).

in this experiment to five participants per group in comparison to the six participants per group in Experiment 2. The reduction in group size is meant to reduce the total information participants must process before making a decision, as well as to highlight the majority and minority opinions in the in-group and out-group treatments. Average payment per participant is \$2.26 US, payments ranged from \$0.083 - \$3.83 US.

Treatments

Participants are randomly assigned to *one of seven* treatments based on block treatment of self-reported political orientation on a 7-point Likert scale (1/3=1 “liberal”) (4=2 “neutral”) (5/7=3 “conservative”).⁴² In Treatments 1-6 I vary the information participants receive about their fellow group members’ attitudes towards a social norm. Participants are assigned to groups in which the majority, three of the four remaining participants either agree or disagree with them about a normative issue. In Treatment 7, rather than receiving information about the social attitudes of other group members, participants view a series of negative and threatening images prior to engaging in a standard communal goods game.

In Treatments 1 & 2, “Control Agree” and “Control Disagree”, prior to the interaction participants are asked to state their opinion about the *relative importance* of two common social norms. Participants are asked to indicate “which of the following social actions do you believe is most important for a person to perform?” A) Saying “please” when asking someone for something, or B) Saying “thank you” when someone does something for you. After responding, participants are matched to a group in which

⁴² There are technically only five Treatments in the study. Treatments 4 & 5 are a sub-division of Treatment 3 & 6. These divisions are a blocking of individuals who, when asked about a normative scenario, indicated that a normative violation did not occur.

three of the four remaining participants either agree or disagree with their normative perspective. Treatment 1, “Control Agree”, combines the responses of all participants, regardless of whether the participant selected “please” or “thank you”. These participants are then assigned to groups in which majority of group of the agreed with their opinion. Treatment 2, “Control Disagree”, combines all responses, regardless of whether they selected “please” or “thank you”, in which the majority of group members disagreed with their position. Treatment 1 & 2 are important as they involve “soft” disagreements, situations of social agreement or disagreements, but in a scenario in which no behavioural norms are actually violated. This is similar to matching participants according to minimal group identity (Yamagishi, Nobuhito, and Tohko 1999). By evoking a sense of shared and unshared identity which is linked to a broad normative outlook, Treatments 1 & 2 provide an important contrast to Treatments 3 & 6, providing a reference point to compare how the behaviour of liberals and conservatives is affected by shared and unshared normative perspectives.

In Treatments 3-6, the normative Treatments, prior to the interaction participants are asked their opinion about a moral scenario. This scenario is taken from research on political ideology conducted by Jonathan Haidt on the moral foundations of liberal and conservative ideological orientation.

The scenario reads as follows:

“A family's dog was killed by a car in front of their house. They had heard that dog meat was delicious, so they cut up the dog's body and cooked it and ate it for dinner. Nobody saw them do this.”

This scenario is selected on the basis of Haidt’s research that finds that, among U.S. participants, the family’s actions in the scenario evoke strong normative intuitions about the appropriateness of an action. More importantly, while the scenario evokes strong sentiments about correctness of behaviour it does not rely on socio-political attitudes that

may correlate with ideological orientation and may potentially confound the results. I use this scenario to evoke a strong feeling of normative consensus and disruption between group members (Haidt 2012 pg. 3).

After reading the normative scenario, participants are asked to indicate whether they felt the family's actions are: A) Morally Acceptable, or B) Morally Unacceptable. Participants are then matched to a group in which three of the four remaining participants either agree or disagree with their individual point of view. The Treatment name refers to the *group's* perspective on the moral scenario and whether it *matches* with an individual participant receiving the Treatment. In Treatment 3, "Unacceptable Agreement", participants who believe the family's actions are morally unacceptable are matched to a group in which the majority of participant also believe the family's actions are unacceptable. In Treatment 4, "Unacceptable Disagreement", participants who indicated that the family's actions are acceptable are matched to a group in which the majority of participants believe the family's actions to be unacceptable. In Treatment 5, "Acceptable Agreement", participants who indicated that the action is acceptable are matched to a group in which the majority of participants indicated this action to be acceptable. In Treatment 6, "Acceptable Disagreement", participants who indicated that the action is unacceptable are matched to a group in which the majority indicated this action to be acceptable.

In comparison to Treatments 1 & 2 in which participants agree or disagree about the *relative importance* of two social norms, in Treatments 3-6 participants may perceive that the social group agrees or disagrees with their normative perspective about a *normative violation*. As a result, participants may perceive that members of the group are

either *upholding or violating* an established set of social norms. The intention is that Treatments 3-6 will provide stronger positive and negative cues than Treatments 1 & 2.⁴³

Based on pilot studies conducted prior to this experiment it was anticipated that the majority of participants would feel the family's actions are morally unacceptable, with participants who feel the actions to be acceptable being a small minority of subjects. Based on this expectation it was decided prior to the experimental analysis that participants with different moral perspectives would be regressed separately.

Treatments:

1. Treatment 1: Control Agreement
2. Treatment 2: Control Disagreement
3. Treatment 3: Unacceptable Agreement
4. Treatment 4: Unacceptable Disagreement
5. Treatment 5: Acceptable Agreement
6. Treatment 6: Acceptable Disagreement
7. Treatment 7: Negative Imagery

Treatment 7, "Negative Imagery", does not directly test the predictions of the GRH and SRH, but evaluates the extent to which the sensitivity to negative stimuli in conservative oriented individuals impacts on general social behaviour. Numerous studies have pointed to the greater tendency of conservative oriented individuals to be more responsive to negative stimuli, such as threatening imagery; however, the extent to which this sensitivity impacts on general social interaction has yet to be explored (Dodd et al., 2012; Inbar, Pizaro, and Bloom 2009; Kanai et al., 2011; Oxley et al., 2008, Schreiber et al., 2013).

⁴³ Prior to this experiment I ran a series of surveys on mTurk to develop this experimental protocol. The first survey tested participants' reactions to a series of normative scenarios. This study, which involved 200 participants, was conducted to help select an appropriate normative scenario for this experiment. The second study, involving 50 participants and a within subject design compared the effect of agreement and disagreement about two normative outlooks on cooperation. Here, I compared the effect of unshared thin group identity to unshared perspective on a moral violation. This study was conducted to ensure there is an observable trend in the response of participants to different treatments. The normative scenarios used in the second pilot differed from those used in this study. This data is not included as part of these final results.

From an evolutionary perspective, determining whether the “greater sensitivity” to negative stimuli in conservative oriented individuals has a general impact on the social behaviour is important for the understanding of the wider function of this trait, as well as broader implications of this behaviour for the development and expression of ideological differences (Hibbing et al., 2014; Oxley et al., 2008). Observing that exposure to a negative, but not socially relevant stimuli, causes a decrease in the willingness of conservative oriented individuals to cooperate socially would suggest that the greater sensitivity to negative stimuli in conservatives is not specifically adaptive for social behaviour, but evolved as a mechanism for broad-spectrum environmental interaction (Hibbing et al., 2014). Alternatively, observing that conservative cooperative behaviour is not differentially affected by negative stimuli, but is more strongly sensitive to the effects of normative disagreement than liberal cooperative behaviour, would suggest that the greater sensitivity to negative stimuli in conservatives has some specific utilities for social interactions. This result would imply that *in general* conservatives may not be more sensitive to negative stimuli, but may be more sensitive to specific types environmental cues, for example the violation of social norms by other social actors (Schreiber et al., 2013 pg. 2).⁴⁴

Treatment 7 “Negative Imagery”, is modeled on a previous experiment conducted by Oxley et al., (2009) that measures the change in skin conductance of liberal and conservative oriented individuals in response to negative or threatening imagery. Following Oxley’s protocol, participants are exposed to three images prior to the communal goods game: 1) a screaming women with a large spider on her face, 2) an open wound filled with maggots, and 3) a man with a bloody and beaten face (see Appendix C).

⁴⁴ The argument is that, as opposed to differing in their general sensitivity to positive and negative cues, liberals and conservatives differ in their sensitivity to specific types of socio-environmental cues such as human, gestures, attitudes, or behaviours (Sell et al., 2009; Sell, Tooby, and Cosmides 2009)

Participants are informed prior to the study that they may be required to view uncomfortable images as part of their participation. Each image is displayed to participants for a fixed period of 10 seconds followed by a 5 second interval. After observing the images participants immediately begin the communal goods game. The goal of the treatment is to observe whether cooperation in conservative oriented participants is negatively affected by a negative prime that is *unrelated* to the social interaction. The question raised by this treatment is whether exposure to general negative stimuli is sufficient to produce a change in the social behaviour of conservatives. To measure the effect, levels of cooperation Treatment 7 “Negative Imagery”, are compared to levels of cooperation in Treatment 2 “Control Disagreement”, allowing a comparison between the negative stimuli of Treatment 7 and the effect of being assigned to a minimal social out-group. Here, I am primarily interested in the within-subject effects and how cooperation in conservatives compares between conditions of social disagreement and a negative stimulus. A significant effect would be if cooperation levels in Treatment 7 are significantly lower in comparison to Treatment 2.

Participants

A sample of 1085 US participants was recruited from Amazon mechanical Turk (mTurk) between April and August of 2016. Research shows that the behaviour of participants recruited from mTurk approximates the behaviour of in lab participants (Berinsky, Huber, and Lens 2012).⁴⁵ Participants are drawn from a larger sample of 6000

⁴⁵ Sample size is based on a two sample two sided inequality. Tests indicated a minimum sample of n=63 participants per Treatment. Based on a mean of 10 units the test assumed a 1.5 unit or 15% affect size, a standard deviation of 3.0 units, and a sampling ratio of 1. Effect size and standard deviation are estimated based on the result of a pilot study involving 50 participants. Based on the seven treatments in this experiment a base sample of N=952 is required. Additional participants are included to ensure a sufficient

mTurk participants who had completed a 2-minute demographic survey prior to the study. Participants received a payment of (\$0.10) for completing the short survey. Participants are recruited based on a self-reported liberal-conservative orientation based on a 7-point Likert scale. A specific attempt was made to avoid recruiting participants who self identified as politically neutral on the self-report measure. During recruitment participants are informed that the study would consist of a short survey and an experiment during which participants would be matched with other mTurk users to complete an interaction. Participants are told that they could earn between (\$0.60-\$4.40) for their participation and that this payment would be based on their decisions in combination with the decisions of other group members. No deception is used during this study. During recruitment participants are told that they would be assigned to groups after all participants had completed the experimental interaction. Participants are told that, in situations where they are provided information about the responses of other participants, they would be matched with participants who gave these actual responses during the study. In behavioural economics this approach is referred to as the strategy method (Brandts and Charness 2009). This information is repeated again to all participants prior to the interaction. Participants also read a short statement about the norms against the use of deception in experimental research. Experimental trials are completed between April and August of 2016. A series of control questions are employed throughout the study to screen out participants who are not answering truthfully.

number of conservative participants are present in the sample. 1400 participants of the 6000 participants who completed the demographic pilot were invited to complete the study.

Survey and Demographic Questions

A total number of N=1085 participant completed this study. During the post study debrief, four participants indicated that they did not believe they would be matched with real participants at the end of the study. These participants are dropped from the statistical analysis, resulting in a final sample of N=1081. The age of the sample ranges from 18-78 years old with a mean of (35.74) years. Sample sex is (49.12%) Male. Political orientation across a 7-point Likert scale is Liberal (n=487), Conservative (n=484), Neutral (n=110). Political orientation by political party affiliation is Democrat (n=505), Republican (n=427), Other (n=149). Prior to the interaction, participants completed a 19-point demographic questionnaire, including age, education, ethnicity, income, religious affiliation, religious observance, political orientation, and a 10 factor personality model (Gosling, Rentfrow, and Swann 2003). Post interaction, participants complete the full measure of implicit social attitudes; and a 21-question Wilson-Patterson Index (Smith et al., 2011).

During the statistical analysis ideological orientation is captured using a 14-question implicit attitude measure developed by Smith et al., (2011) (see Appendix D). Implicit social attitudes are attitudes towards the appropriate structure and function of the social group. This measure was developed by Smith et al., to capture differences in ideological orientation using attitudes towards the structure and function of the social group. I use the implicit attitude measure to capture liberal and conservative ideological orientations. In doing so, I hope to better observe the behavioural differences associated with preferences for social structure, and stability. Within this sample there is a strong

correlation between self-reported ideological orientation on a 7-point liberal-conservative Likert scale and the measure of implicit attitudes (Table 2).

The “Society Works Best” implicit attitude measure is composed of 14 binary response questions designed to measure individuals’ preferences for the structure and function of the social group. The measure is grouped according to five broad attitudinal dimensions: 1) Traditional Values and Moral Codes; 2) Out-group and Rule Breakers; 3) The Role of Individuals and Groups; 4) Absolutes; and 5) Leadership. In this sample, scores on the measure are coded so that a score of 14 is strongly associated with a liberal orientation and a score of 28 with a conservative orientation. Within this sample, scores on the implicit attitude measure ranged from (14-28) points with a mean score of (20.110) and a standard deviation of (3.616). These responses are recoded into a binary categorical variables ranging from (14/21=1 “liberal”) (22/28=2 “conservative”), with liberal coded as the reference category. Based on this measure of ideological orientation participant orientation in this sample is liberal (N=685), conservative (N=396).

Statistical Analysis

Results are modeled using standard OLS regression with robust confidence intervals. The dependent variable is level of cooperation, which ranges from (0-20). Treatment effects are calculated as a two-way interaction between Treatment and a binary categorical measure of ideological orientation. Treatment is coded from 1-7, with Treatment 1, “Control Agreement”, coded as the reference category. Orientation across the Implicit Attitude Measure is coded from 1-2, (Liberal=1) (Conservative=2). A Lincom Function is used to measure the between and within subject effects for different ideological categories in all Treatments. Lincom functions are used to compute point

estimates, standard errors and p-values for linear combinations of coefficients based on a fitted model. The Lincom command allows for measurement of effects sizes while accounting of initial differences in cooperation observed in the reference Treatment.

In analyzing the experimental results I consider both the within and between subject effects. Within-subject effects report the difference in cooperation for individuals with the same ideological orientation between Control and a treatment conditions. Between-subject effects report differences in cooperation for individuals with the different ideological orientations by looking at the change in cooperation between Control and treatment, for each ideological group, and then comparing these differences. This approach is analogous to a *differences and differences* statistical model.

Prior to the regression the normalcy of the dependent variable (cooperation) is evaluated using a Pearson's coefficient of skewedness. The Pearson's test indicated that there is a skew within the levels of cooperation that could potentially bias the comparison of the cooperation between liberals and conservatives. To address the possibility that this skew could impact accuracy of the statistical results I performed a comparison of variance test on the level of cooperation between each ideological category using a Leven's Test of robustness. Based on the study by Conover, Johnson, and Johnson (1981) I focus on the results obtained by substituting the median for the mean (see output W_{50} on Table 3). On the Leven's Test, a P-value below ($P > 0.050$) would indicate that the variances of two variables are significantly different from one another. The results of this test (Table 3) indicate that there are no statistically significant differences in the variance of cooperation between liberal and conservative oriented individuals ($P > 0.871$). A Breusch-Pagan Test of Heteroskedasticity is also performed on each of the statistical models. The result shows that variance of the independent variables in the model is not dependent on the values of the independent variables ($P > 0.527$) (Table 4).

In addition to regression by ideological orientation I also present regressions on the interaction between Treatment and a continuous measure of each the “Big 5” personality traits (Tables 16-26). As mentioned in Chapter 2, personality traits are not only heritable, but are strong predictors of liberal-conservative ideological orientation (Gerber et al., 2011). Regressions of the interactions between personality traits and Treatment are included to examine whether certain personality traits, which correlate with ideological orientation, may be disposed to respond to different socio-environmental stimuli. Because of the strong correlation between personality and ideology within this sample (Table 26), no attempt is made to separate the effects of personality and ideology on cooperation. Rather, I am interested in observing whether ideology and personality show similar interactions in response to specific treatments. Of particular interest is whether the Openness to Experience or Conscientious traits display significant interactions in response to Treatment, as these two traits are highly correlated with ideological orientation. Cooperation is the dependent variable. Results are calculated as interactions between treatment and personality trait with robust confidence intervals using a Lincom function. This is analogous to the *differences and differences* model used to calculate the treatment effects based on ideological orientation. Treatment 1 is coded as a reference category for all regressions. A total of five models are presented, one for each of the “Big 5” measures. Personality traits are measured using the 10 Factor Model developed by Gosling, Rentfrow, and Swann 2003 (Appendix D).

Objectives & Hypotheses

In the following experiment I test whether levels of cooperation in individuals with liberal and conservative ideological orientations are disproportionately affected by the presence of social change, structure, and stability. This experiment has three objectives: 1) investigate the hypothesis of the GRH and SRH concerning the adaptive utility of attitudes towards social change, structure, and stability; 2) to observe whether liberal and conservative oriented individuals respond differently by these conditions; and 3) to observe whether the responses of liberals and conservatives to Treatment approximates the responses observed in Experiments 1 & 2.

In this experiment agreement and disagreement about normative behaviour is used as proxy for social change, structure, and stability. Here, I contrast the effects of social agreement and disagreement about the *relative importance* of a social norm against conditions in which group members agree or disagree about a normative violation. The primary purpose of this manipulation is to determine whether shared perspective on the correctness of a social action significantly affects group cooperation. Particularly, whether cooperation in conservative oriented individuals is *increased* in response to a shared normative perspective on *correct* behaviour.

If the assumptions of the GRH are correct, then cooperation in conservative oriented individuals will be positively affected by the presence of a shared perspective towards a normative violation. This condition is summarized by Hypothesis A1, and is tested in Treatment 3 “Unacceptable Agreement”. Alternatively, if the SRH is correct, then cooperation in conservative oriented individuals will not be positively affected by a shared perspective towards a normative violation, but will decrease in response to an unshared perspective. This condition is summarized in Hypotheses B1 & B2, and is tested in Treatments 6 “Acceptable Disagreement”. While both GRH and SRH expect that

conservative oriented participants will show lower levels of cooperation in response to an unshared perspective, it is a lack of a positive response to a shared perspective that distinguishes the predictions of the SRH from the GRH.

Group Reciprocity Hypothesis (GRH)

Hypothesis A1:

- ☐ Conservative oriented participants will display higher levels of cooperation in social groups with which they share a strong normative position, as compared to groups in which they share a “minimal” identity.

Hypothesis A2:

- ☐ Conservative oriented participants will display lower levels of cooperation in social groups in which the majority of participants approve of a perceived normative violation in comparison to groups in which the majority does not approve of a normative violation.

Hypothesis A3:

- ☐ Compared to liberal oriented participants, conservative oriented participants will display higher levels of cooperation in social groups with which they share a strong normative position, as compared to groups with which they share a “minimal” social identity.

Social Risk Hypothesis (SRH)

Hypothesis B1

- ☐ Conservative oriented participants will *not* display higher levels of cooperation in social groups with which they share a strong normative position, as compared to groups with which they share a “minimal” social identity.

Hypothesis B2:

- ☐ Conservative oriented participants will display lower levels of cooperation in social groups in which the majority of participants approve of a perceived normative violation, compared to groups in which the majority of participants do not approve of a normative violation, and in response to shared “minimal” group identity.

Hypothesis B3

- ☐ Cooperation in liberal participants should not be significantly different between conditions in which they agree or disagree with group members about a minimal social identity.

Within the SRH, no specific prediction is made with respect to whether liberals will cooperate more than conservatives in Treatments 1 “Control Agreement” & Treatment 2 “Control Disagreement”. The SRH states that the social behaviour of liberal oriented

individuals should be sensitive to cues indicating the desire of social partners to reciprocate fairly. However, it is difficult to predict whether liberals will view norms of “please” and “thank you” as providing an indicator of willingness to reciprocate, as both treatment conditions provide participants with information about the normative views of other group members towards a social behaviour. Based on this framework, the expectation is that cooperation between liberals in Treatment 1 “Control Agreement” should not be significantly greater in comparison to Treatment 2 “Control Disagreement”. However, observing a difference between liberals and conservatives in Treatment 1 relative to Treatment 2 would be consistent with the SRH framework, as cooperation in conservatives should not be significantly affected by affirmative cues about a desire of individuals to reciprocate.

While the SRH hypothesis expects that liberals will respond favourably to cues indicating a partner’s desire to reciprocate fairly, it is not explicitly stated whether any of the treatments in this experiment constitute such a positive cue. Within this experiment one possibility is that sharing a perspective about a normative violation or action will provide such a cue. In this view, cooperation in liberal oriented individuals should increase in Treatments 3 “Unacceptable Agreement” & Treatment 5 “Acceptable Agreement”. However, the research by Schreiber et al., (2013) indicates that liberals oriented individuals adjust their behaviour in response to changes in their internal subjective feeling states. This position suggests that the direction of the behavioural change may reflect the nature of the individual’s emotional state. An important question following from this empirical observation is whether social agreement about a *negative* event will increase an individual’s willingness to bear social risks. While no explicit hypotheses are made as to whether cooperation in liberals will increase in response to Treatment 3 “Unacceptable Agreement”, the expectation, based on the results of Schreiber et al., (2013), is that cooperation in liberals between Treatment 3 “Unacceptable Agreement” & Treatment 6

“Acceptable Disagreement” will not be significantly different. This conditions is summarized in Hypothesis B3.

While the expectation is that cooperation in Treatments 3 “Unacceptable Agreement” & Treatment 6 “Acceptable Disagreement” will not be significantly different in liberals, the expectation for cooperation in liberals in Treatments 4 “Unacceptable Disagreement” & Treatment 5 “Acceptable Agreement” is that cooperation will be significantly different. Again, drawing from the results of Schreiber et al., (2013) as well as the research by Haidt 2012, this assumption is based on the fact that judging the family’s actions in the scenario to be morally acceptable involves a socially complex normative perspective which is likely to be associated with a number of socially “liberal” attitudes or social values (Haidt 2012; Jost et al., 2003; Schreiber et al., 2013). Similar to the implicit attitudes cues in Experiment 1, the expectation is that individuals who hold the moral position that the family’s actions are not a moral violation will be sensitive to this information, will receive the information that their partners' think similarly as a positive cue of trustworthiness, and consequently will increase their cooperation (Sosis and Bressler 2003). The expectation of the SRH is that cooperation in Treatment 5 “Acceptable Disagreement” will increase relative to Treatment 1 “Control Agreement”. Furthermore, in Treatment 4, “Unacceptable Disagreement” cooperation in liberal oriented participants should not be significantly lower in comparison to Treatment 2 “Control Disagreement” as individuals who hold the view that the family’s actions did not constitute a normative violation are expected to be aware that their position is a minority perspective and should be less sensitive to an out-group opinion (Haidt 2012, pg. 3)

Experimental Results

Summary of Results

This experiment generated a number of significant insights into the behaviour of liberals and conservatives. The results, although not as straightforward as in Experiment 2, further support the argument of the SRH over that of the GRH. Overall, and contrary to the predictions of the GRH in Hypothesis A1, conservatives fails to show any significant increases in levels of cooperation, but did display a negative effect in response to normative disagreement. By comparison, liberal oriented participants display negative as well as positive effects in response to Treatment.

Beginning with conservative participants, as predicted by the SRH in Hypothesis B1, in Treatment 3, “Acceptable Agreement”, conservative participants failed to show a significant increase in cooperation in response to a shared normative perspective relative to Treatment 1 “Control Agree” (Table 11 & Fig 3), but did show a significant decrease in cooperation in response to Treatment 6, “Unacceptable Disagreement” (-2.273) ($P=0.048$). Also, as predicted by the SRH in Hypothesis B2, the difference in levels of cooperation in conservatives between Treatment 3 “Unacceptable Disagreement” and Treatment 6 “Acceptable Disagreement” is significant (2.773) ($P=0.023$) (Table 13). Importantly, as predicted by the SRH in Hypothesis B3, levels of cooperation in liberal participants between Treatments 3 & 6 are not significantly different (0.907) ($P=0.268$) (Table 13).

While cooperation in liberals between Treatments 2 “Control Disagreement” & Treatment 3 “Unacceptable Agreement” is significantly different (1.563) ($P=0.069$) this effect is explained in part by the expectation based on the work of Schreiber et al., (2013) that, for liberal oriented individuals, agreement about a social violation is not sufficient to increase willingness to bear social risks (Table 12 & Fig 2). Also as expected, cooperation

in liberals in Treatment 4 “Unacceptable Disagreement” is not significantly different from Treatments 1 “Control Agreement” & Treatment 2 “Control Disagreement” (Table 11 & 12). However, as expected, cooperation in Treatment 5, “Acceptable Agreement”, is significantly higher in comparison to Treatment 1 “Control Agree” (3.279) ($P=0.029$) (Table 11 & Fig 2). As expected by the SRH, the difference in cooperation between liberals in Treatment 4, “Unacceptable Disagreement”, and Treatment 5, “Acceptable Agreement”, is also significant (-4.496) ($P=0.029$) (Table 13). Lastly, in Treatment 2 “Control Disagreement” levels of cooperation in conservatives are significantly lower in comparison to liberals (-2.122) ($P=0.030$).

Finally, as expected according to the SRH, levels of cooperation in conservative oriented individuals are not significantly affected by the presence of negative stimuli in Treatment 7 “Negative Imagery” (Table 11 & Fig 3), suggesting that a general exposure to a negative stimulus is not sufficient to induce a change in conservative behaviour. This result is important for the overall argument that behavioural differences associated with liberal and conservative ideological orientations are specifically adaptive for social interaction.

Fig 1:

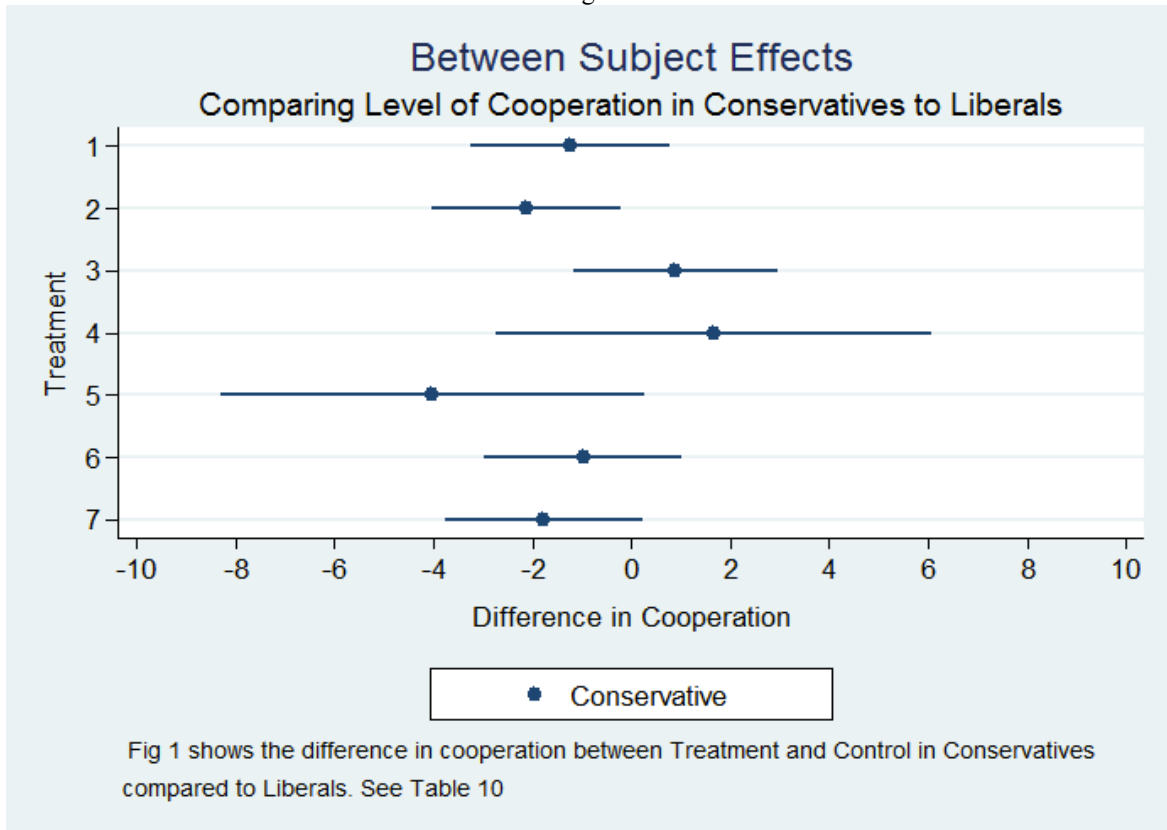


Fig 2:

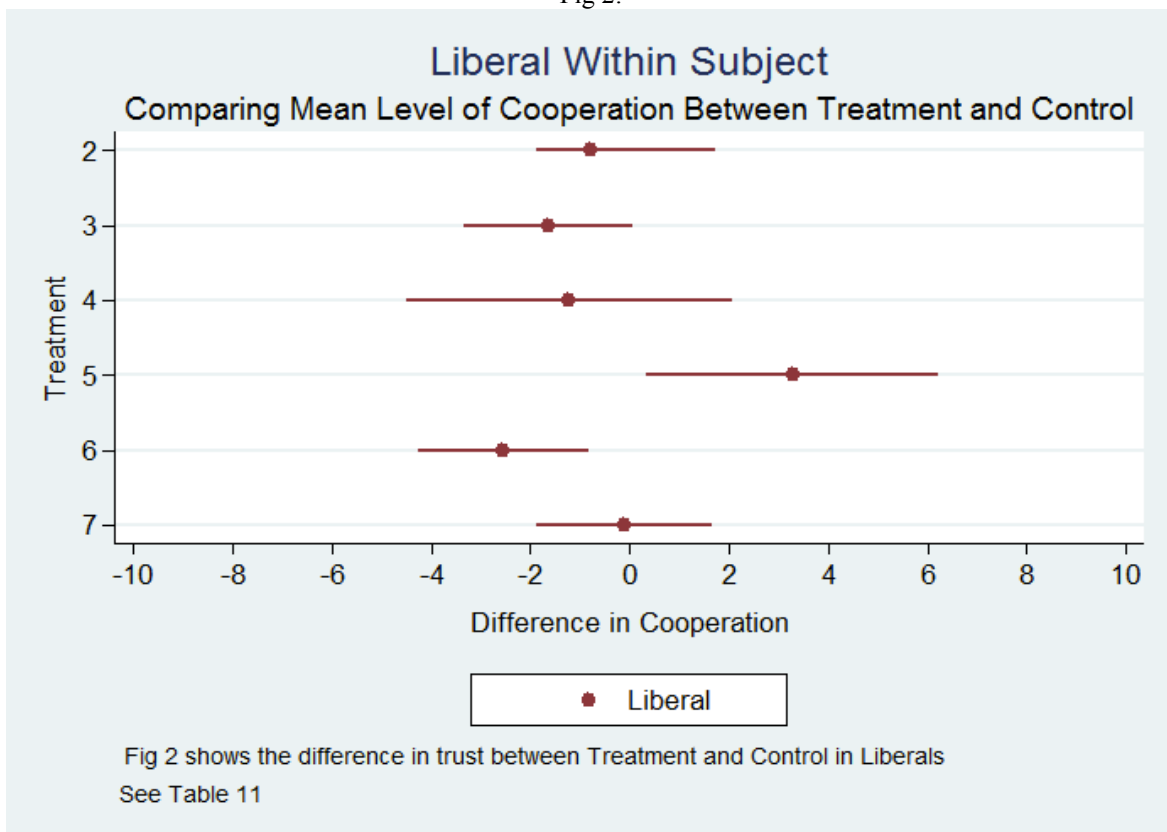
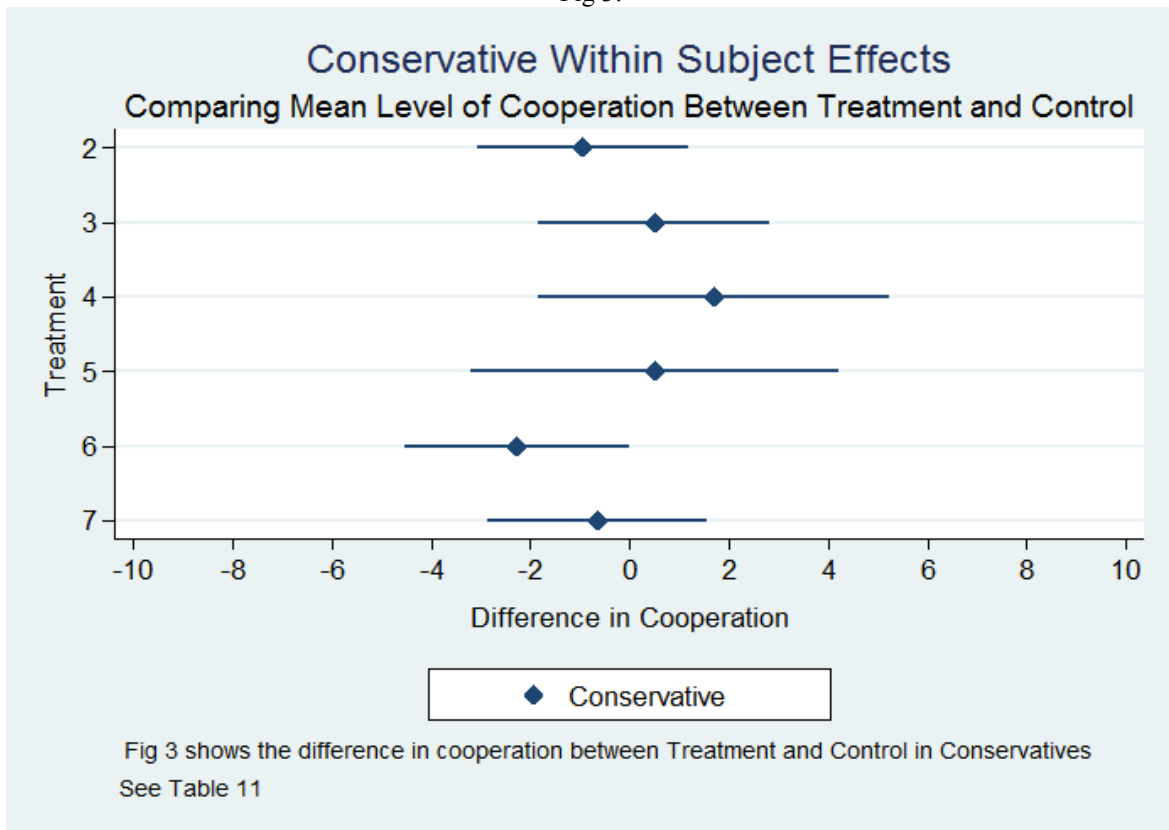


Fig 3:



Overall Treatment Effects

Looking at the overall Treatment effects without ideological orientation (Table 5), no differences in cooperation are observed between Treatment 1 “Control Agreement” and Treatment 2, 3, 4, or 7. In Treatment 5, “Acceptable Agreement”, cooperation is significantly higher in comparison to Treatment 1, “Control Agreement”. This effect reaches significance at the 90% confidence level (2.304) ($P=0.056$). Comparing cooperation in Treatment 5 “Acceptable Agreement” to Treatment 2, “Control Disagreement”, (Table 6) shows that cooperation in Treatment 5 is significantly different

from Treatment 2. This effect reaches significance at the 95% confidence level (-2.718) (P=0.023).

Comparing the effect of Treatment 4, “Unacceptable Disagreement”, to Treatment 5, “Acceptable Agreement”, (Table 7) shows that cooperation in Treatment 4 is lower in comparison to Treatment 5. However, this effect reached failed to reaches significance (-2.635) (P=0.109).

Comparing the effect of Treatment 6, “Acceptable Disagreement”, to Treatment 1 “Control Agreement” (Table 5), cooperation in Treatment 6 is significantly lower in comparison to Treatment 1. This effect reaches significance at the 99% confidence level, (-2.427) (P=0.001). Comparing cooperation in Treatment 6 “Acceptable Disagreement” to Treatment 2, “Control Disagreement”, (Table 6) shows that cooperation in Treatment 2 is still significantly higher from Treatment 6. This effect reaches significance at the 95% confidence level (2.013) (P=0.003). Comparing the difference in cooperation between Treatment 3 “Unacceptable Agreement” to Treatment 6 “Acceptable Disagreement” (Table 7) shows that levels of cooperation in Treatment 3 are significantly higher in comparison to Treatment 6. This effect reaches significance at the 95% confidence level (1.583) (P=0.021).

The results of Treatment 6 “Acceptable Disagreement” show that assigning individuals who felt the actions of the family in the moral scenario violated a social norm to groups who did not recognize this violation had a negative and significant effect on cooperation relative to Treatments 1 “Control Agreement” & Treatment 2 “Control Disagreement”. However, matching individuals to groups that shared this same perspective on the normative violation, Treatment 3, fails to significantly increase cooperation relative to Treatment 1 and 2.

Between Subject Effects

Looking at the between subject effects for liberals and conservatives, in Treatments 1, 3, 4, 6 there are no significant difference between cooperation in liberals and conservatives (Table 10). In Treatment 2, “Control Disagreement”, cooperation in conservatives is significantly lower than liberals relative to cooperation in Treatment 1 “Control Agreement” (Table 10). This effect is significant at the 95% confidence level (-2.122) ($P=0.030$). Contrary to the predictions of the GRH in Treatment 3 “Unacceptable Agreement” cooperation in conservative is not significantly higher than Liberals (0.892) ($P=0.400$). Consequently, *for hypothesis A3, I fail to reject the null*. Consistent with the SRH framework in Treatment 5 “Acceptable Disagreement”, cooperation in conservatives is lower than liberals relative to cooperation in Treatment 1 “Control Agreement” (Table 10). This effect reaches significance at the 90% confidence level (-4.029) ($P=0.065$). In Treatment 7 “Negative Imagery”, cooperation in conservatives is lower than liberals relative to Treatment 1 (Table 10). This effect reaches significance at the 90% confidence level (-1.778) ($P=0.080$).

Within Subject Effects

Beginning with liberal oriented individuals, in comparison to Treatment 1 “Control Agreement” no significant differences in cooperation are observed in Treatments 2, 4, or 7 (Table 11). In comparison to Treatment 2 “Control Disagreement” no significant differences are observed between Treatments 4 & 7 (Table 12). Consequently, *for hypothesis B3, I reject null*.

In Treatment 3, “Unacceptable Agreement”, liberals show significantly lower levels of cooperation in comparison to Treatment 1 “Control Agreement” (Table 11). This effect reaches significance at the 90% confidence level (-1.642) ($P=0.060$). Comparing cooperation in Treatments 2 & 3, cooperation in Treatment 2 “Control Disagreement” is also significantly higher in comparison to Treatment 3 “Unacceptable Disagreement” (Table 12). This effect reaches significance at the 90% confidence level (1.563) ($P=0.069$). In Treatment 5, “Acceptable Agreement”, cooperation in liberals is significantly greater in comparison to Treatment 1 “Control Agreement” (Table 10). This effect reaches significance at the 95% confidence level (3.279) ($P=0.029$). Comparing cooperation between Treatment 2 “Control Disagreement” and Treatment 5 “Acceptable Agreement”, cooperation in Treatment 2 is significantly lower in comparison to Treatment 5 (Table 12). This effect reaches significance at the 95% confidence level (-3.358) ($P=0.025$).

Looking at the difference in cooperation in liberals between Treatments 3 “Unacceptable Agreement” & Treatment 6 “Acceptable Disagreement”, as predicted by the SRH, levels of cooperation between these two Treatments is not significantly different (Table 13). Looking at the difference in cooperation between Treatment 4 “Unacceptable Disagreement” & Treatment 5 “Acceptable Agreement”, as expected, levels of cooperation in Treatment 4 are significantly lower than in Treatment 5 (Table 13). This effect reaches significance at the 95% confidence level (-4.496) ($P=0.029$).

In Treatment 6, “Acceptable Disagreement”, cooperation in liberals is lower in comparison to Treatment 1 “Control Agreement” (Table 10). This effect reaches significance at the 95% confidence level (-2.548) ($P=0.004$). Comparing Treatment 2 “Control Disagreement” and Treatment 6 “Acceptable Disagreement”, levels of cooperation in Treatment 2 is also significantly higher in comparison to Treatment 6 (Table 12). This effect reaches significance at the 95% confidence level (2.470) ($P=0.004$).

Lastly, comparing levels of cooperation between in-group and out-group Treatments, as expected, a significant difference in cooperation is observed between Treatments 4 “Unacceptable Disagreement” & Treatment 5 “Acceptable Agreement” (Table 12). This effect reaches significance at the 95% confidence level (-4.496) ($P=0.029$). Comparing levels of cooperation between Treatment 3 “Unacceptable Agreement” & Treatment 6 “Acceptable Disagreement”, again as expected, no significant difference is observed in cooperation (Table 12).

Looking at the within subject effects for conservatives, in comparison to Treatment 1 “Control Agreement” no significant differences in cooperation are observed in Treatments 2, 3, 4, 5, 7 (Table 11). In comparison to Treatment 2 “Control Disagreement” no significant differences are observed in any Treatment (Table 12). Consequently, *for hypothesis A1 I fail to reject the null, while for hypothesis B1 I reject null*. Furthermore, as expected by the SRH, comparing levels of cooperation in Treatments 1 “Control Agreement” & Treatment 2 “Control Disagreement” to those in Treatment 7 “Negative Imagery” shows that cooperation in conservatives does not significantly decrease in response to a general negative stimulus (Table 11 and 12).

Comparing the difference in cooperation between Treatment 1 “Control Agreement” and Treatment 6 “Acceptable Disagreement” shows that cooperation in Treatment 6 is lower in comparison to Treatment 1 (Table 11). This effect reaches significance at the 95% confidence level (-2.273) ($P=0.048$). Comparing the cooperation between Treatment 2 “Control Disagreement” and Treatment 6 “Acceptable Disagreement” shows that cooperation in Treatment 2 is not significantly different from Treatment 6 (1.323) ($P=0.237$) (Table 12). This result is somewhat contrary to expectations; however, the result is explained in part by the large, but not significant,

decrease in conservative cooperation between Treatments 1 & 2 (-0.950) ($P=0.380$) (Table 11).⁴⁶

More important to the prediction of the SRH is the difference in cooperation between Treatments 3 & 6. Here, as predicted by the SRH, levels of cooperation in conservatives between Treatments 3 “Unacceptable Disagreement” & Treatment 6 “Acceptable Disagreement” are significantly different (Table 13). This effect reaches significance at the 95% confidence level (2.773) ($P=0.023$). Consequently *for hypotheses A2 and B2 I reject null*. Also as predicted, no significant difference is observed in levels of cooperation in conservatives between Treatments 4 “Unacceptable Disagreement” and Treatment 5 “Acceptable Agreement” (Table 13).

Discussion

Overall, the results of this experiment are consistent with the expectations of the SRH for the adaptive utility of behavioural differences associated with liberal and conservative ideological orientations. Together, the differences in behaviour observed in this experiment further support the argument of the SRH that liberal and conservative ideological orientations are based on alternative adaptive strategies to avoid social environmental risks. First, similar to the observations in Experiment 1, conservative participants failed to increase their levels of cooperation in response to “positive” social cues about a shared normative perspective. This result supports the argument of the SRH that preferences for normatively stable and structured environments are not based on a

⁴⁶ My original expectation was that the effect size in Treatment 6 would be larger in comparison to Treatment 2. The logic being that, in response to a stronger negative stimuli, individuals with an increased sensitivity to negative stimuli would show a larger effect. However, based on the results obtained, it may be more accurate to understand the greater sensitivity to negativity not in terms of magnitude of effect but in terms of a behavioural response; that is, a greater likelihood to change behaviour in response to a wider range of “negative” environmental cues.

strategy to maximize returns from social interaction by increasing the level of reciprocity between individuals within a social group, but instead may reflect a strategy that attempts to minimize social losses by identifying and avoiding potential threats. Looking at the responses of liberals and conservatives to out-groups treatments, the results support the interpretation that conservative social behaviour is more sensitive to social disagreements and violations than the social behaviour of liberal participants. Comparing cooperation in Treatment 6 “Acceptable Disagreement” to Treatment 3 “Unacceptable Agreement” (Table 13), conservative cooperation in Treatment 6 is significantly lower in comparison to Treatment 3 ($P > 0.023$), while cooperation in liberals is not significantly different between the two treatments. Furthermore, looking at the difference in cooperation between liberals and conservatives in Treatment 1, “Control Agreement”, compared to Treatment 2, “Control Disagreement”, conservative cooperation in Treatment 2 is significantly lower than liberals ($P > 0.030$). Taken together, the results demonstrate that conservative oriented individuals are more sensitive to the effects of social disagreement and instability than liberal oriented individuals.

Furthermore, the failure of conservative oriented individuals in Treatment 7 “Negative Imagery” to decrease cooperation in response to a general negative stimulus emphasizes that, while conservative may be more sensitive or receptive to, negative cues from their surrounding environment, this increased sensitivity does not necessarily correlate with a difference in behavioural outcomes. Instead, when considering the impact of negative stimuli on the general behaviour of liberals and conservatives the nature of the stimuli matters. This result is important, as a number of studies within the social sciences suggest that the increased sensitivity to negativity is a causal feature of conservative ideological orientation, but have done so without exploring how the sensitivity to negativity actually informs individuals’ attitudes or values (Hibbing 2014; Kinai 2011).

Consequently the results of this experiment support the interpretation of the SRH that the behavioural differences associated with liberal and conservative ideological orientation may have evolved as social adaptations to identify and avoid potential social threats.

Taken together, the difference in responsiveness of liberals and conservatives to agreement and disagreement about a normative violation is significant to the argument that ideological differences are a product of alternative adaptive strategies for social interaction. As in Experiment 1 & 2, the results of Experiment 3 show that liberals and conservatives display a sufficient level of behavioural variation in response to socio-environmental cues that evolutionary selection could have acted upon these traits over multiple generations. These results further support the argument that liberal-conservative ideological differences are a result of frequency dependent strategies; strategies whose utility depends on the distribution of other actors or conditions within a surrounding environment. As discussed in Chapter 2, under different environmental conditions an increase in sensitivity to normative disagreement or violation may increase fitness and utility by allowing individuals to avoid exploitation by untrustworthy social partners. Alternatively, a decrease in sensitivity to disagreement or violations could increase fitness and utility as actors are more receptive to a wider range of potential social cues and social partners, and therefore increase their opportunities to engage in beneficial interactions. In Chapter 6 I review the argument that liberal and conservative behavioural differences are a product of frequency dependent strategies in light of the results of the three experiments conducted in this thesis.

Personality Interactions

Looking at the interactions between personality traits and treatment, no significant interactions are observed between Treatment and Openness, Conscientiousness, Emotional Stability, or Agreeableness (Tables 16-25). However, on the measure of Extraversion two significant interactions are observed (Table 17). First, a negative interaction is observed between personality and Treatment 2 “Control Disagreement”. This effect reaches significance at the 95% confidence level (-0.321) ($P=0.020$). Second, a positive interaction is observed between personality and Treatment 3 “Unacceptable Agreement”. This effect reaches significance at the 95% confidence level (0.435) ($P=0.004$). These results show that, in comparison to Treatment 1 “Control Agreement”, cooperation in Extraverted individuals decreases in Treatment 2 “Control Disagreement” in response to disagreement about the relative importance of a social norm, but increases in Treatment 3 “Unacceptable Agreement” in response to shared opinions about a normative violation.

While the results suggest that Extraverted individuals may be sensitive to conditions of social agreement and disagreement, because studies find that Extraversion is only loosely correlated with ideological orientation these results do not provide substantial insight into the causes of behavioural differences associated with liberal-conservative ideologies (Gerber et al., 2011). However, the fact that Openness to Experience and Conscientiousness, the two personality traits that are most strongly correlated with ideological orientation, did not show a significant response to treatment suggests that the sensitivity to positive and negative stimuli among liberals and conservative may be linked to behavioural traits other than personality.

Tables

Table 1: Participants by Self-report Liberal-Conservative Orientation on a 7-point Likert Scale.

Orientation	Obs.	Percent
Liberal	685	63.37%
Conservative	396	36.63%
Total	1081	100%

Table 2. Linear Regression of Scores on Self-Reported Liberal-Conservative Orientation on Score on the Implicit Attitude Measure. Ideological is Scored on a 7-point Likert Scale.

Ideology	Coef..	Std.	P> z	Conf Int.
Ideological Orientation	1.362	.043	0.000	1.278 1.445
cons	14.779	.185	0.000	14.416 15.141

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 3: Leven's Robustness Test Comparing the Variance in Cooperation Between Liberals and Conservatives Based on a Measure of Implicit Attitudes.

Ideology	Mean	Std.	Freq.
Liberal	3.888	2.231	685
Conservative	3.854	2.263	396
Totals	3.875	7.285	1081
W0	0.616	df (1, 134)	Pr > F = 0.433
W50	0.026	df (1,134)	Pr > F = 0.871
W10	0.616	df(1, 134)	Pr > F = 0.433

P > 0.05* Denotes a Significance Difference in Variance

Table 4: Breusch-Pagan Test of Heteroskedasticity.
Norm Experiment

Variables	Treatment#Attitudes
Chi2 (20)	12.01
Prob > Chi2	0.5271
P > 0.05* Denotes Significance	

Table 5: Linear Regression Model of Cooperation by Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.414	0.704	0.557	-1.796 0.968
Treatment 3	-.844	0.703	0.230	-2.224 0.535
Treatment 4	-.331	1.327	0.803	-2.935 2.273
Treatment 5	2.304	1.204	0.056*	-0.058 4.666
Treatment 6	-2.427	0.697	0.001***	-3.794 -1.060
Treatment 7	-.324	0.706	0.646	-1.709 1.061
cons	9.281	0.506	0.000	8.288 10.274

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 6: Comparing Levels of Cooperation in Treatment 2 to All Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2- T3	.430	0.692	0.534	-0.926 1.787
T2- T4	-.083	1.321	0.950	-2.674 2.509
T2- T5	-2.718	1.197	0.023**	-5.066 -0.369
T2- T6	2.013	0.685	0.003**	0.669 3.357
T2- T7	-.090	0.694	0.897	-1.452 1.272

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 7: Comparing Levels of Cooperation Between Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T3- T4	-.513	1.320	0.698	-3.104 2.077
T3- T5	-3.148	1.196	0.009**	-5.495 -0.801
T3- T6	1.583	0.684	0.021**	0.241 2.924
T4- T5	-2.635	1.642	0.109	-5.858 0.588
T4- T6	2.096	1.316	0.112	-0.488 4.680
T5- T6	4.731	1.192	0.000***	2.391 7.071

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 8: Comparing Levels of Cooperation Between Control Treatments and In-group Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
(T1-T2) – (T3- T6)	-1.169	0.982	0.234	-3.095 0.757
(T1-T2) – (T4- T5)	3.049	1.787	0.088*	-0.458 6.555

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 9: Linear Regression of the Effect of a Two-way Interaction Between Treatment and Liberal-Conservative Ideology on Cooperation

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2 Liberal	-.078	0.916	0.932	-1.876 1.720
Treatment 3 Liberal	-1.642	0.872	0.060*	-3.354 0.070
Treatment 4 Liberal	-1.217	1.676	0.468	-4.505 2.072
Treatment 5 Liberal	3.279	1.502	0.029**	0.331 6.227
Treatment 6 Liberal	-2.548	0.878	0.004**	-4.272 -0.825
Treatment 7 Liberal	-0.124	0.901	0.891	-1.893 1.644
T1 Conservative	-1.25	1.026	0.223	-3.263 0.763
T2#Conservative	-.872	1.418	0.539	-3.656 1.911
T3#Conservative	2.142	1.474	0.147	-0.751 5.034
T4#Conservative	2.917	2.462	0.236	-1.913 7.747
T5#Conservative	-2.779	2.412	0.249	-7.513 1.954
T6#Conservative	.276	1.446	0.849	-2.562 3.113
T7#Conservative	-.528	1.443	0.715	-3.360 2.304
cons	9.75	0.657	0.000	8.461 11.039

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 10: Between Subject Effects. Levels of Cooperation in Conservatives as Compared to Liberals in each Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservatives	-1.25	1.026	0.223	-3.263 0.763
T2. Conservatives	-2.122	0.979	0.030**	-4.043 -0.200
T3. Conservatives	.892	1.059	0.400	-1.185 2.969
T4. Conservatives	1.667	2.238	0.457	-2.724 6.057
T5. Conservatives	-4.029	2.183	0.065*	-8.313 0.255
T6. Conservatives	-.974	1.019	0.339	-2.974 1.025
T7. Conservatives	-1.778	1.015	0.080*	-3.770 0.214

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 11: Within Subject Effects. Levels of Cooperation in Liberals and Conservatives Compared to Liberals and Conservatives in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2. Liberal	-.078	0.916	0.932	-1.876 1.720
T3. Liberal	-1.642	0.872	0.060*	-3.354 0.070
T4. Liberal	-1.217	1.676	0.468	-4.505 2.072
T5. Liberal	3.279	1.502	0.029**	0.331 6.227
T6. Liberal	-2.548	0.878	0.004**	-4.272 -0.825
T7. Liberal	-.124	0.901	0.891	-1.893 1.644
T2. Conservative	-.95	1.082	0.380	-3.074 1.174
T3. Conservative	.5	1.188	0.674	-1.831 2.831
T4. Conservative	1.7	1.803	0.346	-1.838 5.238
T5. Conservative	.5	1.887	0.791	-3.203 4.203
T6. Conservative	-2.273	1.149	0.048**	-4.527 -0.019
T7. Conservative	-.652	1.127	0.563	-2.864 1.560

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 12: Within Subject Effects. Comparing Levels of Cooperation in Liberals and Conservatives to Liberals and Conservatives in Treatment 2.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2- T3 Liberal	1.563	0.859	0.069*	-0.122 3.249
T2- T4 Liberal	1.138	1.669	0.495	-2.126 4.413
T2- T5 Liberal	-3.358	1.494	0.025**	-6.290 -0.425
T2- T6 Liberal	2.470	0.865	0.004**	0.773 4.167
T2- T7 Liberal	.046	0.888	0.959	-1.697 1.788
T2- T3 Conservative	-1.45	1.158	0.211	-3.723 0.823
T2- T4 Conservative	-2.65	1.784	0.138	-6.150 0.850
T2- T5 Conservative	-1.45	1.869	0.438	-5.117 2.217
T2- T6 Conservative	1.323	1.118	0.237	-0.871 3.516
T2- T7 Conservative	-.298	1.096	0.786	-2.448 1.852

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 13: Within Subject Effects. Comparing Levels of Cooperation in Liberals and Conservatives to Liberals and Conservatives in Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
T3- T4 Liberal	-.425	1.645	0.796	-3.653 2.803
T3- T5 Liberal	-4.921	1.468	0.001***	-8.802 -2.041
T3- T6 Liberal	.907	0.818	0.268	-0.699 2.512
T4- T5 Liberal	-4.496	2.050	0.029**	-8.519 -0.474
T4- T6 Liberal	1.332	1.648	0.419	-1.902 4.566
T5- T6 Liberal	5.828	1.471	0.000***	2.940 8.715
T3- T4 Conservative	-1.2	1.850	0.517	-4.829 2.429
T3- T5 Conservative	0.001	1.932	0.999	-3.791 3.791
T3- T6 Conservative	2.773	1.221	0.023**	0.377 5.168
T4- T5 Conservative	1.2	2.360	0.611	-3.431 5.831
T4- T6 Conservative	3.973	1.825	0.030**	0.393 7.553
T5- T6 Conservative	2.773	1.908	0.146	-0.971 6.516

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 14: Within Subject Effects. Comparing Levels of Cooperation Between Liberals in In-group and Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1-T2 Liberal	.078	0.916	0.932	-1.720 1.876
T3- T6 Liberal	.907	0.818	0.268	-0.699 2.511
T4- T5 Liberal	-4.496	2.050	0.029**	-8.519 -0.474
T1-T2 vs. T3- T6	-.828	1.228	0.500	-3.239 1.582
T1-T2 vs. T4- T5	4.574	2.245	0.042**	0.168 8.980
T3-T6 vs. T4- T5	5.403	2.207	0.015**	1.072 9.734

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 15: Within Subject Effects. Comparing Levels of Cooperation Between Conservatives in In-group and Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1-T2 Conservative	.950	1.082	0.380	-1.174 3.074
T3- T6 Conservative	2.773	1.221	0.023**	0.377 5.168
T4- T5 Conservative	1.200	2.360	0.611	-3.431 5.831
T1-T2 vs. T3- T6	-1.823	1.631	0.264	-5.024 1.378
T1-T2 vs. T4- T5	-2.900	3.753	0.440	-10.263 4.463
T3-T6 vs. T4- T5	1.573	2.657	0.554	-3.641 6.787

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 16: Between Subject Effects. Comparing Cooperation between Liberals and Conservatives in In-group and Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib T1-T2 vs. Con T1-T2	.872	1.418	0.539	-3.654 1.911
Lib T3-T6 vs. Con T3-T6	-1.866	1.469	0.204	-4.749 1.017
Lib T4-T5 vs. Con T4-T5	-5.696	3.126	0.069*	-11.830 0.438
Lib (T1-T2) – (T3-T6) Cob (T1-T2) – (T3-T6)	.994	2.042	0.626	-3.013 5.002
Lib (T1-T2) – (T4-T5) Cob (T1-T2) – (T4-T5)	4.824	3.433	0.160	-1.912 11.560
Lib (T3-T6) – (T4-T5) Cob (T3-T6) – (T4-T5)	3.830	3.454	0.269	-2.948 10.608

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 17: Breusch-Pagan Test of Heteroskedasticity. Extraversion Model.

Variables	Treatment#Attitudes
Chi2 (20)	9.33
Prob > Chi2	0.7476

P > 0.05* Denotes Significance

Table 18: Linear Regression of the Effect of a Two-way Interaction Between Treatment and Extraversion on Levels of Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-1.591	1.602	0.321	-1.554 4.735
Treatment 3	-4.120	1.629	0.012	-7.316 -0.924
Treatment 4	1.175	3.177	0.711	-5.058 7.409
Treatment 5	1.553	2.447	0.526	-3.248 6.354
Treatment 6	-1.610	1.618	0.320	-4.784 1.564
Treatment 7	-1.095	1.701	0.520	-4.432 2.242
Extra	-0.022	0.148	0.880	-0.312 0.267
T2 Extra	-.298	0.202	0.140	-0.694 0.098
T3 Extra	.458	0.210	0.029	0.046 0.870
T4 Extra	-.216	0.399	0.588	-0.999 0.567
T5 Extra	.117	0.345	0.735	-0.560 0.794
T6 Extra	-.114	0.204	0.577	-0.515 0.287
T7 Extra	-.106	0.213	0.619	-0.312 0.525
cons	9.437	1.168	0.000	7.146 11.728

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 19: Effect of Extraversion on Cooperation in each Treatment Compared to Extraverts in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.022	0.148	0.880	-0.312 0.267
Treatment 2	-.321	0.138	0.020**	-0.591 0.050
Treatment 3	.435	0.149	0.004**	0.143 0.728
Treatment 4	-.238	0.371	0.520	-0.966 0.489
Treatment 5	.094	0.312	0.761	-0.517 0.707
Treatment 6	-.136	0.141	0.335	-0.414 0.141
Treatment 7	.084	0.154	0.586	-0.218 0.386

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 20: Breusch-Pagan Test of Heteroskedasticity.
Openness to Experience Model.

Variables	Treatment#Attitudes
Chi2 (20)	11.63
Prob > Chi2	0.5582
P > 0.05* Denotes Significance	

Table 21: Linear Regression of the Effect of the a Two-way Interaction Between
Treatment and Openness to Experience on Levels of Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.835	2.939	0.532	-3.931 7.602
Treatment 3	-2.777	3.101	0.371	-8.862 3.307
Treatment 4	1.327	6.156	0.829	-10.752 13.405
Treatment 5	2.006	3.986	0.615	-5.815 9.826
Treatment 6	.978	2.911	0.737	-4.735 6.690
Treatment 7	-.535	3.174	0.866	-6.763 5.694
Open	.086	0.223	0.700	-0.353 0.525
T2 Open	-.228	0.287	0.428	-0.792 0.336
T3 Open	-.194	0.300	0.518	-0.394 0.782
T4 Open	-.163	0.598	0.785	-1.337 1.010
T5 Open	.033	0.402	0.935	-0.756 0.822
T6 Open	-.343	0.288	0.234	-0.908 0.222
T7 Open	.019	0.309	0.950	-0.586 0.624
cons	8.418	2.258	0.000	3.987 12.850

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 22: Effect of Openness on Cooperation in each Treatment Compared to Openness in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.086	0.224	0.700	-0.353 0.525
Treatment 2	-.142	0.180	0.432	-0.496 0.212
Treatment 3	.280	0.199	0.161	-0.111 0.671
Treatment 4	-.077	0.554	0.889	-1.165 1.011
Treatment 5	.119	0.334	0.722	-0.537 0.774
Treatment 6	-.257	0.181	0.157	-0.612 0.099
Treatment 7	.105	0.212	0.619	-0.311 0.522

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 23: Breusch-Pagan Test of Heteroskedasticity.
Conscientiousness Model.

Variables	Treatment#Attitudes
Chi2 (20)	10.03
Prob > Chi2	0.6918

P > 0.05* Denotes Significance

Table 24: Linear Regression of the Effect of a Two-way the Interaction Between Treatment and Conscientiousness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.195	3.339	0.953	-6.747 6.357
Treatment 3	-.326	3.503	0.926	-7.200 6.548
Treatment 4	-.832	6.241	0.894	-13.079 11.414
Treatment 5	2.005	5.592	0.720	-8.968 12.978
Treatment 6	-1.415	3.446	0.681	-8.176 5.346
Treatment 7	1.449	3.380	0.668	-5.184 8.081
Consc	-.096	0.218	0.659	-0.523 0.331
T2 Consc	-.022	0.299	0.941	0.608 0.564
T3 Consc	-.045	0.308	0.884	-0.650 0.560
T4 Consc	.044	0.586	0.940	-1.106 1.195
T5 Consc	.025	0.501	0.960	-0.958 1.009
T6 Consc	-.090	0.306	0.769	-0.690 0.510
T7 Consc	-.160	0.301	0.595	-0.752 0.431
cons	10339	2.414	0.000	5.603 15.075

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 25: Effect of Conscientiousness on Cooperation in each Treatment Compared to Conscientiousness in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.096	0.218	0.659	-0.523 0.331
Treatment 2	-.118	0.204	0.563	-0.519 0.283
Treatment 3	-.141	0.218	0.519	-0.570 0.288
Treatment 4	-.051	0.544	0.925	-1.120 1.016
Treatment 5	-.071	0.452	0.876	-0.957 0.816
Treatment 6	-.186	0.215	0.387	-0.608 0.236
Treatment 7	-.256	0.208	0.219	-0.666 0.153

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 26: Breusch-Pagan Test of Heteroskedasticity.
Emotional Stability Model.

Variables	Treatment#Attitudes
Chi2 (20)	17.17
Prob > Chi2	0.1914

P > 0.05* Denotes Significance

Table 27: Linear Regression of the Effect of a Two-way Interaction Between Treatment and Emotional Stability on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-1.970	2.183	0.367	-6.253 2.314
Treatment 3	-1.313	2.252	0.560	-5.733 3.106
Treatment 4	5.044	4.310	0.242	-3.413 13.501
Treatment 5	-1.813	4.192	0.665	-10.038 6.412
Treatment 6	-5.602	2.189	0.011	-9.898 -1.306
Treatment 7	3.106	2.347	0.186	-1.500 7.712
Emotional Stability	.076	0.164	0.643	-0.247 0.399
T2 Emotional S	.158	0.221	0.475	-0.276 0.593
T3 Emotional S	.045	0.226	0.841	-0.398 0.488
T4 Emotional S	-.522	0.428	0.224	-1.362 0.319
T5 Emotional S	.423	0.394	0.283	-0.350 1.196
T6 Emotional S	.318	0.223	0.154	-0.120 0.756
T7 Emotional S	-.344	0.237	0.146	-0.809 0.120
cons	8.526	1.587	0.000	5.412 11.640

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 28: Effect of Emotional Stability on Cooperation in each Treatment Compared to Emotional Stability in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.076	0.165	0.643	-0.247 0.399
Treatment 2	.234	0.148	0.114	-0.056 0.525
Treatment 3	.122	0.154	0.431	-0.181 0.424
Treatment 4	-.445	0.395	0.260	-1.221 0.330
Treatment 5	.499	0.358	0.163	-0.203 1.202
Treatment 6	.395	0.151	0.009	0.099 0.690
Treatment 7	-.268	0.170	0.116	-0.602 0.066

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 29: Breusch-Pagan Test of Heteroskedasticity. Agreeableness Model.

Variables	Treatment#Attitudes
Chi2 (20)	10.36
Prob > Chi2	0.6645

P > 0.05* Denotes Significance

Table 30: Linear Regression of the Effect of a Two-way Interaction between Treatment and Agreeableness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.361	2.924	0.642	-4.377 7.099
Treatment 3	.101	3.194	0.975	-6.167 6.368
Treatment 4	.205	4.953	0.967	-9.514 9.924
Treatment 5	.746	5.274	0.888	-9.603 11.094
Treatment 6	-.330	3.062	0.914	-6.338 5.677
Treatment 7	1.071	2.992	0.720	-4.799 6.941
Agreeableness	.092	0.176	0.622	-0.273 0.456
T2 Agreeableness	-.171	0.276	0.536	-0.712 0.370
T3 Agreeableness	-.091	0.295	0.759	-0.670 0.488
T4 Agreeableness	-.050	0.476	0.916	-0.984 0.884
T5 Agreeableness	.158	0.491	0.748	-0.805 1.120
T6 Agreeableness	-.198	0.282	0.483	-0.752 0.256
T7 Agreeableness	-.134	0.279	0.633	-0.682 0.415
cons	8.327	1.946	0.000	4.508 12.147

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 31: Effect of Agreeableness on Cooperation in each Treatment Compared to Agreeableness in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.092	0.186	0.622	-0.273 0.456
Treatment 2	-.079	0.204	0.698	-0.480 0.321
Treatment 3	.001	0.230	0.997	-0.450 0.451
Treatment 4	.041	0.439	0.925	-0.819 0.902
Treatment 5	.249	0.454	0.583	-0.642 1.140
Treatment 6	.106	0.213	0.617	-0.523 0.311
Treatment 7	-.042	0.209	0.841	-0.452 0.368

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 32: Correlations Between Implicit Attitude Measure and the "Big 5" Personality Traits. Higher Scores on the Implicit Attitude Measure are Associated with a Conservative Ideological Orientation.

Variable	Coef.	Std. Err	P> z	Conf Int
Openness	-.371	0.045	0.000***	-0.460 -0.281
Extraversion	.056	0.035	0.109	-0.012 0.125
Conscientiousness	.244	0.049	0.000***	0.145 0.343
Agree	-.167	0.048	0.000***	-0.261 -0.073
Emotion Stability	.099	0.042	0.019**	0.016 0.181
Cons	21.499	0.657	0.000	20.209 22.788

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Chapter Six: Discussion

Section1: Review of Overall Experimental Results

In this chapter I review the results of the three experiments conducted in this thesis. I discuss the findings of these experiments with respect to the Group Reciprocity (GRH) and Social Risk (SRH) Hypotheses on the adaptive significance of ideological orientation. I also consider the wider implications of these results for further research on the causes of social attitudes associated with ideological orientation. This chapter is divided into five sections. In Section 1, I review the objective of this thesis. I also review the objectives of the three experiments conducted in this thesis and the significance of the results as they relate to the predictions of the Group Reciprocity (GRH) and Social Risk (SRH) hypotheses. In Section 2, I review how the experimental results support the argument that liberal and conservative orientations have been influenced by evolutionary factors. I also reiterate the evolutionary argument for the adaptive significance of ideological differences as frequency dependent strategies for social interaction. In Section 3, I discuss potential limitations to the argument that liberal and conservative ideological orientations are a product of adaptive behaviours. In Section 4, I consider how the experimental results may further our understanding of the relationship between social attitudes and political behaviour. Employing the concept of “niche construction” from the evolutionary sciences, I argue that the understanding of ideology and political behaviour in political science may benefit from a theoretical lens that views the competition between different socio-political attitudes as attempts by individuals to reshape the social environment to better suit their individual traits. In Section 5, I conclude by discussing several additional opportunities to further test the flexibility and predictive power of the SRH.

Section 1: Review of Experimental Results

The objective of this thesis is to investigate the causes of the liberal-conservative dimension of the ideological spectrum. Adopting an evolutionary approach I ask the question, “are liberal and conservative differences a product of alternative *adaptive* strategies to maximize returns from social interaction?” In studying the adaptive significance of liberal and conservative differences, I focus on the potential adaptive utility of attitudes towards social change and inequality. Repeated studies show that these two attitudinal dimensions consistently correlate with ideological orientation (Jost et al., 2003; Hatemi et al., 2014; Smith et al., 2011). Repeated studies also show that these social attitudes contain a significant hereditary influence, suggesting an evolutionary component to their development and expression within the population (Alford et al., 2005; Alford et al., 2008; Hatemi et al., 2008; Hatemi 2010; Hatemi et al., 2011; Hatemi et al., 2014).

Based on a behavioural analysis I develop two theoretical frameworks, the Group Reciprocity (GRH) and Social Risk (SRH) Hypotheses, to account for the *evolutionary* utility of the behavioural differences associated with liberal and conservative ideological orientations. Based on these unique differences, as well as the inherently social nature of politics, I focus on the utility of these behaviours for social interaction. Finally, I test these frameworks in three novel experiments.

Informed by research into the effect of group norms, social structures, and shared identity on social interaction, the Group Reciprocity Hypothesis (GRH) argues that liberal and conservative differences are based on alternative strategies to maximize returns from social interaction by increasing the “absolute” levels of reciprocity within a social group. The term “absolute reciprocity” refers to the frequency of beneficial interactions that occur between members of a social group, as well as the extent of an individual’s contribution to those interactions. Alternatively, informed by research into the cognitive and physiological

sciences, such as differences brain activity, brain volume, and physiological responses, the Social Risk Hypothesis (SRH) argues that liberal and conservative differences are based on alternative strategies to maximize returns from social interaction by minimizing socio-environmental risks, such as the cost of social exploitation. According to the SRH, the cooperative behaviour of liberal oriented individuals reflects a strategy of wary cooperation; a strategy that is initially reluctant to participate in social interactions, but whose willingness to interact is strongly sensitive to positive social cues. By comparison, the behaviour of conservative individuals is initially open to social interaction; however, this willingness is strongly sensitive to negative cues from the surrounding environment.

Looking at the results of all three experiments conducted in this thesis, the combined results more closely reflect the predictions of the Social Risk Hypothesis (SRH) over those of the Group Reciprocity Hypothesis (GRH). As predicted by the SRH, trust and cooperation of liberal oriented individuals are more responsive to positive social cues such as shared attitudes, political orientation, or the decision of other group members to redistribute payouts than among conservative oriented participants. By comparison, trust and cooperation in conservative oriented participants was much more responsive to negative cues such as unshared attitudes, unshared identity, or normative disagreement. Contrary to the predictions of the GRH, trust and cooperation in conservative oriented individuals did not increase in response to positive cues, such as shared implicit attitudes or agreement about the correctness of a normative action. Additionally, I find limited support for the prediction of the SRH that conservative oriented individuals will be initially more likely to participate in a social interaction than liberal oriented individuals. However, unlike the evidence concerning the responsiveness of liberal and conservative individuals to positive and negative stimuli, which is obtained in all three experiments, support for this claim on the prosocial tendencies of conservatives is obtained only in Experiment 1.

In Experiment 1, “Implicit Attitudes as Social Cues,” I test the effect of implicit social attitudes on the willingness of liberals and conservatives to trust an anonymous social partner during a risky social interaction, a trust game. The two objectives were; 1) to observe whether knowledge of another person’s social attitudes, specifically attitudes towards change and inequality, could affect individuals’ willingness to bear social risks, and 2) to observe whether this effect varied by ideological orientation. Under these conditions the GRH predicts that, if liberal and conservative behavioural differences are a product of alternative adaptive strategies to increase the absolute level of reciprocity within a social group, then trust in *both* liberals and conservatives should increase in response to *shared* social attitudes. Alternatively, the SRH predicts that, if liberal and conservative behavioural differences are a product of alternative strategies to minimize socio-environmental risks, then two things should happen. First, under no information conditions, trust in liberals will be lower in comparison to conservatives, but will increase in response to a positive social cue. Second, trust in conservatives will decrease in response to a negative social cue, but will not increase in response to a positive social cue. In both cases social cues refer to shared and unshared implicit social attitudes.

Consistent with the predictions of the SRH, trust in liberals was initially lower in comparison to conservatives, but significantly increases in response to a positive social cue. By comparison, trust in conservatives decreases in response to a negative cue, but did not increase in response to a positive social cue. These initial results suggest that the attitudinal differences of liberals and conservatives do not reflect different strategies to increase cooperation within a social group. Instead, the difference in sensitivity and responsiveness to socio-environmental stimuli supports the argument that liberal and conservative ideological differences reflect alternative strategies to avoid socio-environmental risk.

Experiments 2 & 3 were designed to further test the likelihood of the GRH and SRH hypotheses by manipulating social conditions to reflect the two dimensions of liberal and conservative attitudes identified by Jost et al (2003), attitudes towards social change and inequality. In Experiment 2, “Social Inequality,” I test the effect of intragroup inequality on cooperation within a social group. The two objectives of this experiment were; 1) to observe whether cooperation in liberals was disproportionately affected by intragroup inequality in comparison to conservatives; and 2) to separate the effect of general inequality on cooperation from the effect of inequality that is a product of decision-making by other group members. Under these conditions the GRH predicts that, as a strategy to increase the absolute level of cooperation, cooperation in liberals should be highly sensitive to conditions of inequality, decreasing in social groups in which there is a *general* inequality between group members. In comparison, the SRH predicts that, as an alternative strategy to avoid social risks, cooperation in liberals would not be sensitive to *general* inequality. Instead cooperation in liberals would increase in response to positive social cues, the desire of other group members to reciprocate fairly, and decrease in response to a negative social cue, the desire of other group members to maintain an existing inequality. By comparison, cooperation in conservatives is expected to decrease in response to the same negative social cue, but *not* to increase in response to the same positive social cue.

As predicted by the SRH, cooperation in liberals is not significantly affected by the presence of a general group inequality, but is affected by positive cues about the desire of other group members to reciprocate fairly. Also as predicted by the SRH, cooperation in conservatives decreased in response to a negative social cue, but did not increase in response to a positive social cue. These results strongly supported the conclusions of Experiment 1; that liberals and conservatives differ in their sensitivity and responsiveness to environmental stimuli.

An important deviation from the results of Experiment 1 is that during the Control condition of Experiment 2, Treatment 1 “Equality”, no significant differences are observed between the levels of cooperation in liberals and conservatives. While higher levels of cooperation in conservatives were not explicitly predicted in Experiment 2, due to concerns that emphasizing the equality of the groups’ payout may constitute a prime/positive cue for liberal oriented individuals, the fact that cooperation between these two groups is not significantly different limits the support generated for the hypothesis that conservatives individuals are more likely to engage in a social interaction as part of an adaptive strategy. The full implications of this difference will be discussed further in the “Limitations of the Experimental Results” section of this chapter. In the remainder of the discussion I proceed on the basis of the results collected in this thesis, including the higher levels of initial trust observed in conservatives in Experiment 1, but I acknowledge the need for further research into whether liberals and conservatives display differences in their initial willingness to trust and cooperate.

In Experiment 3, “Normative Stability,” I test whether conditions of social agreement and disagreement about a normative violation affect the willingness of individuals to cooperate with a social group. The core objective of this experiment is to observe whether cooperation in conservative oriented individuals is sensitive to conditions of social agreement and disagreement about a normative action. Under these conditions, the GRH predicts that cooperation in conservatives will increase when they are matched to a group that shares the same perspective on the correctness of a normative action, and that it will decrease when matched to a group that does not share this perspective. By comparison, the SRH predicts that cooperation in conservatives will not increase in response to being matched with a group that shares the same normative perspective, but will decrease when matched with a group that does not share this perspective.

Once again, the results support the predictions of the SRH. Cooperation in conservatives decreased in response to being matched to a group that did not share their normative perspective, but failed to increase when they were matched to a group that did share their perspective. While liberal participants also showed a negative effect in response to being matched to a group that did not share their normative perspective, the difference between in-group and out-group effects was not significant in liberals, but did reach significance in conservatives. The results support the interpretation of the SRH that conservative oriented individuals are more sensitive to negative social cues than liberal oriented individuals.

Section 2: Understanding the Adaptive Significance

Overall, the conclusion that liberal and conservative oriented individuals differ in their sensitivity to socio-environmental stimuli supports the argument made by the Social Risk Hypothesis (SRH); that liberal and conservative ideological differences are a product of *alternative adaptive strategies* to avoid socio-environmental risk, such as the cost of exploitation.⁴⁷ As discussed in Chapters 3, 4, and 5, the increases in levels of trust and cooperation in liberal oriented, but not conservative oriented, individuals in response to positive stimuli, as well as the greater sensitivity to negative stimuli in conservatives, provides a sufficient amount of behavioural variation to argue for the evolution of these behavioural differences in terms of frequency dependent selection. By increasing their social investment in response to positive social cues, liberal oriented individuals have an opportunity to increase their social utility relative to conservative oriented individuals.

⁴⁷ Crucial to this conclusion is that liberals and conservatives showed significant behavioural variations in response to a variety of socio-environmental stimuli. From an evolutionary perspective, the existence of variation is important for determining the adaptive significance of a trait, as it is the variation in outcomes that allows for a difference in utility across environmental conditions.

However, as the rewards from the social investment are dependent upon the reciprocation of other social agents, liberals risk incurring greater costs of exploitation from untrustworthy social partners. In this view the social strategy of liberal oriented individuals is *wary and risk accepting*.

In comparison, conservative oriented individuals are more willing to commit to social interactions but are initially more vulnerable to the costs of exploitation than liberals. However, the increase in willingness to commit to interactions may allow conservative oriented individuals to take advantage of social opportunities as they present themselves within a social group. The potential advantage of this strategy is that conservatives, unlike liberals, do not need to wait for signals of trustworthiness before fully committing to a social interaction. In social environments in which there is competition for social partners and advantages associated with maintaining strong social bonds, withholding trust and cooperation could be damaging to individuals' fitness if doing so risks losing out on beneficial social opportunities. For example, primate research shows that there is a strong negative correlation between the number of bonds a mother has with members of the social group and her rate of infant mortality (Flack et al., 2006; O Schülke et al., 2010; Silk et al., 2009). Furthermore, the increase in sensitivity to negative stimuli allows conservatives to adjust their behaviour to avoid future exploitation. In this view, conservatives can be said to maximize their opportunities for beneficial interactions, while minimizing future risks. In other words, conservative social behaviour is *open and loss adverse*.

In environments with high levels of reciprocation, low frequencies of exploitation, or low costs for investment, such as structured or cohesive social groups, an open strategy may be beneficial as the risks of social investment are relatively low. From an evolutionary perspective, preferences for social stability may be advantageous in that they minimize the risks associated with an open approach to social interaction. Stable and

structured environments also increase the visibility of social violations, reducing costs associated with monitoring the social environment and identifying potential social violators, further reducing the risks associated with an open social strategy. Given their dispositions towards habitual behavioural responses under novel conditions (Amodio et al., 2007), stable and structured environments may further contribute to the social utility of conservative oriented individuals by helping them identify and avoid potential violators.

In comparison, the strategy of liberal oriented individuals may miss out on potentially beneficial opportunities, but in doing so is less vulnerable to initial exploitation. In social environments with high levels of defectors, with high costs for initial investments, or which are socially divisive or unstable, for example, social groups with high levels of internal competition for resources, a wary social strategy may be beneficial as the initial cost of exploitation is higher relative to more stable social environments (Nowak 2006).

Returning to the SRH framework, liberal preferences are not specifically aimed at creating an egalitarian social environment but are instead interested in obtaining reciprocity from social interaction. What liberal oriented individuals want first and foremost are fair returns on their *individual* social investments, but not necessarily on the investments of other actors. Liberal social behaviour is therefore not based on a model of social altruism but on wary cooperation. Based on this model, it is probable that liberals *are* using social attitudes as cues about the intentions of individuals to reciprocate fairly; however, these attitude are not the result of direct evolutionary selection, but are most likely a byproduct of selection on other behavioural traits. Taken together, the results of these experiments and the observed behavioural differences, such as the lower sensitivity to negative stimuli (Oxley et al., 2008), differences in brain volume and activity in cognitive regions associated with affective decision-making and emotional regulation (Kinai et al., 2011), greater cognitive flexibility (Amodio et al., 2007), and the monitoring

of internal subjective feeling states during risky decision-making (Schreiber et al., 2013) suggest that liberal oriented individuals may be receptive to a different variety of social cues than conservative individuals. In this respect implicit social attitudes are simply one example of a spectrum of social cues that trigger different behavioural responses. Other cues that may warrant further investigation are body size, facial morphology or expression, emotional behaviour, and/or personality (Bailenson et al., 2009; Murray and Schmitz 2011; Sell, Tooby, and Cosmides 2009; Sell et al., 2009; Torodov 2005).

Section 3: Limitations of Experimental Results

In this thesis I argue that liberal and conservative ideological orientations could be viewed as alternative *adaptive* strategies for social interaction. As discussed in Chapter 1, this argument is based on the heritability of social attitudes associated with liberal and conservative ideological orientations in combination with the logic of the phenotypic gambit. Based on this argument, I developed the GRH and SRH to evaluate the social utility of behavioural differences associated with liberal and conservative ideological orientations within an evolutionary framework. While the evolutionary framework used in this thesis is consistent with the approaches utilized in the life sciences, there are a several limitations that are relevant to the interpretation of the experimental results.

As briefly noted in Chapter 2, one criticism is that, while the behavioural differences associated with liberal and conservative orientations may reflect adaptive behaviours, *how can we know* that they are specifically adaptive for *social interaction* and not some other form of behaviour. For example, how do we know that the difference in sensitivity to positive and negative stimuli in liberals and conservatives is not a product of

a general environmental mechanism? Could liberals just be more sensitive to all manners of positive stimuli and conservatives to all manners of negative stimuli?

Based exclusively on the approach taken in this thesis, while there is no way to be certain about the adaptive function for which a behavioural trait *originally* evolved, reasonable inferences can be made by observing how the trait is used within a specific environment, and how this usage benefits an individual organism. Looking at the research conducted in this thesis, the experimental results show that the behavioural differences of liberal and conservative oriented individuals are capable of impacting individual social utilities in a way that is relevant for individual fitness. In Experiment 1, trust in liberal oriented individuals increases in response to positive cues in the form of social information about the implicit attitudes of other group members, but not in response to shared preferences for a favourite sport. Similarly, trust in conservatives oriented individuals decreased in response to unshared implicit attitudes and unshared preferences for a favourite sport, but not in response to unshared political orientation. In Experiment 3, in response to negative images neither liberals nor conservatives showed decreased levels of cooperation relative to Control Treatment; however, cooperation in liberal and conservative oriented individuals did decrease in response to being matched to a social group that disagreed with their perspective on a normative violation. Taken together, the results of these experiments demonstrate that the social behaviour of liberal and conservative oriented individuals is not *generally* affected by positive and negative cues. Instead the experiments show that, while liberal and conservative oriented individuals may differ in their sensitivity to cues, the nature of the stimuli is important for producing a behavioural change. While this observation does not prove that liberal and conservative behavioural differences were selected for on the basis of their contribution to social interaction, it does demonstrate that these differences are associated with different social utilities under different environmental conditions. Importantly, the difference in utility

under different conditions is a fundamental precursor for the evolution of different traits by natural selection. In light of the heritability of traits associated with liberal and conservative ideological orientations, such as social attitudes and values, the evidence strongly supports the hypothesis that some aspect of these behavioural differences have been selected for on the basis of their contribution to social behaviour within our evolutionary history.

A second response to the criticism that there is no way to be certain about the adaptive function for which a behavioural trait *originally* evolved is that, even if differences in the sensitivity to environmental stimuli *did* evolve historically as traits for general socio-environmental experience, the fact that these differences are presently influencing the outcomes of social behaviour justifies the study of these differences within an evolutionary framework. Within the evolutionary literature, a preadaptation (or exadaptation) is a process by which an existing trait of an organism adopts a novel function where no function previously existed, or which is different from the function for which it had originally evolved (Gould and Vrba 1982). While it is possible that the behavioural differences of liberals and conservatives may not have initially evolved to benefit social interactions, under the novel conditions of the contemporary social environment, such as the reduced risks of predation, increased group size and complexity, and the increased anonymity of social actors, the behavioural traits associated with liberal and conservative ideological orientations may have adapted to perform different, socially beneficial functions. As demonstrated by the experimental results, differences in the sensitivity to environmental stimuli do influence the expression of human social behaviour in a way that can directly impact on individual fitness. The result is a vector for

behavioural selection.⁴⁸ Consequently, thinking about political differences as competing strategies to maximize individuals' utility in response to conditions of the external environment may provide a common framework with which to unpack the complexity of social attitudes as well as to provide insight into the motivation behind political behaviours and political differences.

A final limitation of the experimental results concerns the hypothesis that, in comparison to liberals, conservative oriented individuals are initially more likely to engage in a social interaction. This hypothesis is based on research showing that individuals with strong preferences for normative and structured environments, such as member of religious communities, were more likely to make fair contributions during a social interaction (Sosis 2000; Sosis and Bressler 2003); on research that shows that conservatives are less likely to update their behaviour under novel conditions (Amodio et al., 2007); and on research, such as American National Election Study (ANES) data, that finds that conservatives were more likely to report being trusting in others (Anderson, Mellor, Milyo 2005). Based on this research the expectation is that conservative individuals would show higher levels of trust and cooperation during social interactions because this is their default social disposition. It is also assumed on the basis of the ANES data that interacting with an anonymous social partner would not, in and of itself, constitute a negative cue that could potentially impact their levels of cooperation.

⁴⁸ It is extremely difficult to estimate at what point selection pressure from social interaction may have begun to act upon variation in the sensitivity to environmental stimuli; e.g. the near or distant past. However, the evidence on the coevolution of the human neocortex, group size, and language suggests that human social groups have been sufficiently large and complex to allow for a period of gradual selection (Dunbar 1993, Hill and Dunbar 2003). However, by virtue of their smaller size, early social groups did not have the same array of complex social norms as those present in contemporary social groups, thereby limiting the range of behaviour that would have been subject to social monitoring and selection. However, the increasing complexity, normativity, and anonymity of contemporary social groups presents increased opportunities for social monitoring and social norm violation. Under these conditions it is possible that differences in sensitivities to environmental stimuli may experience increased selection pressures as the costs and rewards associated with these behaviours continue to increase.

The core problem is that the assumption that conservatives will be initially more willing to trust and cooperate with an anonymous partner appears contrary to studies which find that conservative individuals are more likely to view the world as a dangerous place, and subsequently, should be more likely than liberals to view an anonymous partner as a potential threat (Asbrock, Sibley, and Duckitt 2010; Duckitt and Fisher 2003; Smith et al., 2013). In other words, based on attitudes associated with conservative ideological orientations, conservatives should not be more willing to initially trust and cooperate.

While the fact that conservative oriented individuals did not show significantly higher levels of trust in Treatment 1 of Experiment 2 “Control” is not sufficient to fully reject this hypothesis, it does present an opportunity for a reasonable doubt about the validity of this prediction. In light of the mixed support and previous research suggesting that conservatives should be initially wary of outsiders, further study is required to fully substantiate whether conservatives, in comparison to liberals, are disposed towards social interaction. In considering this revision attention should also be given to whether the differences in behaviour between these groups is better captured by a model which focuses on the responses to positive and negative stimuli alone, potentially avoiding the conflict between perspective literatures (Axelrod 1984; Axelrod 1987; Lomborg 1996).

Alternatively, given research which finds that conservatives have a greater sensitivity to threat (Oxley et al., 2009), as well as research suggesting that conservative are more likely to view that the world as a dangerous place (Asbrock, Sibley, and Duckitt 2010; Duckitt and Fisher 2003), an additional consideration for future research is whether the structure of the social interaction, e.g. a dichotomous trust game vs. multi party communal goods game, results in heterogeneous effects between liberals and conservatives. In other words, are conservative more likely to interact with another anonymous individual as opposed to a group of anonymous actors? If so, is this difference a product of perceived social risk? A second consideration, which will be discussed in the section on “Further Research and

Predictions”, is whether the results of Experiment 1, that conservatives are initially more likely to trust and participate in social interactions, could have an alternative interpretation that is directly related to the structure of the experimental games in Experiments 1 & 2? In this case, is it that conservatives are more likely to participate in social interactions in general, or whether they are more likely to seek out, or initiate, social interactions with specific social partners? In other words, are the higher levels of trust in conservatives in Experiment 1 a result of a disposition to initiate, or signal, beneficial social interactions rather than a disposition towards social interaction in general, such as the communal goods in Experiment 2?

Section 4: Implications for Social Attitudes

While this project focuses on the evolutionary influences of political ideology, the relationship between ideology and social attitudes is crucial for unpacking the adaptive significance of liberal and conservative orientations. Each of the experiments conducted in this thesis explored the functional relationship between attitudes, behaviour, and ideology. One of the goals of these interactions is to determine whether the attitudes themselves contain their own unique element of social utility, or whether they are a byproduct of some other underlying behavioural differences. While the results do not support the argument that social attitudes themselves have a unique and adaptive social function, when viewed with an evolutionary lens the attitudes do provide insight into the basis of social and political behaviour.

In light of the behavioural differences associated with liberal and conservative oriented individuals, such as differences in the sensitivity to environmental stimuli, one method for thinking about the role of social attitudes for individuals is in terms of *niche*

construction. An important concept in the study of behaviour in the evolutionary sciences, *niche construction* is “a process whereby organisms modify their own (and other organisms) environment to such a degree that it changes the selection pressures acting on present and future generations of the organism.”⁴⁹ Within this model, individuals modify their environments to better suit their individual traits. For example, beaver are a species known for drastically altering the conditions of their surrounding environment to benefit their unique traits. Beaver, through the construction of beaver dams, alter water levels and flood their surrounding environment. In doing so, beaver alter environmental conditions in a way that is beneficial for their semi-aquatic lifestyle (Laland, Odling-Smee, Feldman 2000). This transformation of environmental conditions also alters the selection pressures of the surrounding environment in a way that is potentially beneficial for beaver and their offspring, but at the same time potentially detrimental for other species whose habitat is altered as a result of the increased water levels (Laland, Odling-Smee, Feldman 2000).

Applying this concept to the study of politics, individuals’ preferences for the structure and function of the social group, their attitudes, values, and beliefs, may reflect implicit preferences for the kinds of environments that benefit their unique characteristics - environments where their social strategy is optimized in a way that may contribute to their individual fitness. One of the benefits offered by this perspective is that it elaborates on the psychological foundations of why individuals adopt certain attitude positions. For example, Jost’s theory of motivated social cognition argues that individuals “gravitate” towards the positions that best suit their psychological needs; however, from an evolutionary perspective, the cause of these psychological needs is never fully developed in terms of their contribution to individual utility (Jost et al., 2003). Nor does Jost provide a framework to account for the variation in individuals’ psychological needs. However, by

⁴⁹ Definition taken from the online semiotics encyclopedia at the E.J. Pratt Library, Victoria University. <http://www.semioticon.com/seo/N/niche.html>

applying the perspective of niche construction, individuals can be viewed as gravitating towards or adopting specific social attitudes because these attitudes reflect a state of affairs that compliments the adaptive strategy expressed by their unique traits.

A second benefit of this approach is that it allows for a more complete *causal* understanding of the social competition associated with different social attitudes. Using a framework such as niche construction to understand the motivation of actors to adopt specific attitudinal positions moves the level of analysis from an intention level based on the pursuit of conscious interests to the functional and mechanistic levels that are based on the fitness of an individual trait under specific environmental conditions. In this view, politics is not purely defined by the pursuit of conscious interests, but involves the competition over the conditions and resources that are most beneficial to your unique traits. One area of political science that may benefit from research on niche construction is the study of political polarization. Within the US context, while research points to a number of social and political factors as contributing to the polarization of political parties, the proliferation of these increasingly divergent and conflicting positions is poorly understood (Abramowitz and Saunders 2008; Fiorina and Abrams 2008; Layman, Carsey, and Horowitz 2006). However, through its unique insight into social construction and competition, research on niche construction may help political scientists understand the increasing polarization of political parties by revealing the individual motivations underlying such different social perspectives.

A final benefit of an evolutionary approach to behaviour informed by niche construction is that it provides a mechanism to account for why some actors are perceived to vote against their interests. Within the contemporary literature on political behaviour, a common issue with rational voter models is the ability to explain why actors are “irrational” and vote against their interests by rejecting parties or policies that would be of direct benefit to themselves. A classic example is why lower income voters reject parties

or policies that favour tax reforms and income redistribution (Bartles 2009). Initially discussed in Chapter 1, the problem facing the rational models in the social sciences is not with the structure of the models themselves, as rational models are simply analytic frameworks with which to model interactions, but with level of analysis at which the rational model is applied and the behavioural assumption underlying the analysis (Gintis 2016).

At an intentional level of analysis, the levels of analysis at which many rational actor models in the social sciences are constructed, individual's decisions (votes) are viewed as conscious calculations meant to maximize the interests of an individual actor (Pickup, Kimbrough, and De Rooji 2016). A core assumption of these models is that individuals know what their interests are and how best to go about achieving their desired outcomes. The problem for these models is that individuals have been repeatedly shown to vote against their interests (Bartles 2009) by acting in a manner that is shown to be less effective at achieving their preferred outcome. While irrational outcomes present a serious problem at an intentional level of analysis, at an evolutionary level the contradiction between intention and action can be explained in terms of tradeoffs between individuals' stated intentions and their unconscious biases or dispositions. Within the evolutionary literature on behaviour, the concept of "mismatch" refers to "a state of disequilibrium between an organism and its environment" whereby a trait that evolved in one environment becomes maladaptive in another environment (Lloyd, Wilson, and Sober 2011 pg. 3). Within the mismatch framework, "irrational" decisions on the intentional level may be consistent with individuals exercising preferences for the structure and function of the social group that may have been historically beneficial for their individual traits, but which are not necessarily adaptive within the context of a contemporary political environment. By rejecting social policies that appear contrary to their political interests, individuals may actually be pursuing an adaptive strategy, expressing non-conscious

preferences for social conditions that have been advantageous towards their traits in their evolutionary past. For example, in the case of low-income individuals, by rejecting parties or policies in favour of redistribution these individuals may be understood to be voting in favour of conditions that more closely reflect their core dispositions, such as preferences for the structure or function of the social group, or the rejection of social change and uncertainty. In this view, the alternative way suggested by this thesis is to think about how voters perceive political parties is not in terms of the specific issues or policies they advocate, but in terms of the social conditions they represent, such as conditions of social change vs. stability. Lastly, the application of an evolutionary framework informed by “mismatch theory” allows for apparent contradictions, such as individuals exercising preferences for social stability while at the same time recognizing that they may disproportionately benefit from policies of social change and redistribution (Pickup, Kimbrough, and De Rooji 2016). In summary, because an evolutionary approach to behaviour is predicated on the utility of behavioural outcomes under different environmental conditions, it does not need to reconcile conflicts between actors’ stated interests and their observed behavioural preferences.

Section 5: Further Predictions and Research

In light of the findings of this thesis, there are now several opportunities for further research into the adaptive significance of liberal and conservative differences. Below, I outline some of these opportunities for further study in relation to the SRH framework developed in this thesis. First, based on the SRH, if liberal attitudes toward social change and inequality are a byproduct of an adaptive strategy to obtain reciprocity as opposed to a desire for an egalitarian social group, then it is expected that liberal and conservative

oriented individuals should display similar levels of the social altruism under general environmental conditions. One method for further testing this hypothesis would be to compare the rates at which individuals engage in costly third party punishment after observing an unfair social interaction. Studies show that individuals do engage in third party punishment, but that this behaviour is limited to situations in which a member of an individual's immediate social group receives unfair treatment. (Fehr and Fischbaker 2004; Gülerk, Irlenbusch, and Rockenback 2006). A further test of the predictions of the SRH would therefore be to compare whether liberal and conservative oriented individuals differ in the extent to which they are willing to engage in third party punishment, and whether punishment behaviour varies when it has a direct impact on individuals' future interactions with their social group.

Based on the framework of the SRH, liberal and conservative oriented individuals will not differ in the extent to which they engage in third party punishment involving two members of social out-groups. However, in conditions involving two members of their own social in-group, the expectation of the SRH is that liberal and conservative oriented individuals will display different punishment behaviour under different social conditions. Following from their greater sensitivity to negative and threatening stimuli (Oxley et al., 2008; Schrieber et al., 2013) and their greater preferences for normatively stable and structured environments (Jost et al., 2003), after observing the unfair treatment of an in-group member by a fellow in-group member conservative individuals will be more likely to engage in costly punishment than liberal oriented individuals. However, when the unfair treatment is preceded by a positive social cue by the offending in-group member - a signal about the desire of this group member to reciprocate fairly - then the punishment behaviour of liberal oriented individuals will be greater in comparison to conservative oriented individuals. Important for this study are controls for the nature of the group identity, the measurement of both the frequency and extent to which individuals engage in

third party punishment, and manipulation and control over the extent of the violation observed.

A second prediction based on the research conducted in this thesis concerns the utility behind differences in the willingness of liberals and conservatives to initiate social interactions. In Section 1 of this chapter, I suggested that the increased openness to social interaction associated with conservative oriented individuals may be beneficial in social environments where there is strong competition over social partners, or where the creation and maintenance of social relationships has direct benefits to individual fitness, such as decreasing the rates of infant mortality by increasing the level of parent investment from other group members (Flack et al., 2006; O Schülke et al., 2010; Silk et al., 2009). If the increased openness to social interaction associated with conservative oriented individuals contributes to individual utility by creating and maintaining beneficial social relationships, then conservative oriented individuals should be more willing to incur the costs of initiating or maintaining these relationships even when the cost is non-refundable. By comparison, liberal oriented individuals, who are initially wary of exploitation, should be more likely to wait to receive proposals from other social actors. Following the framework of the SRH, the expectation is that conservative individuals would be more likely to incur a non-refundable cost to initiate a social interaction than liberal oriented individuals. Observing such a difference would be highly significant, as it would further support the argument that the behavioural differences of liberal and conservative oriented individuals are specifically adaptive for social interaction.

Finally, a third prediction extending from the SRH is that, if conservative oriented individuals prefer attitudes for stable and structured environments because they lower the costs of social monitoring and increase the visibility of social violations, then conservative

oriented individuals should be better able to identify social actors who have previously committed a social violation. If conservative oriented individuals prefer stable and structured environments as part of a strategy to identify and avoid untrustworthy social partners, then conservative oriented individuals, as opposed to liberal oriented individuals, should be better at remembering which partners are untrustworthy. This prediction is partially supported by the research of Shook and Fazio (2009), which shows that during a novel learning and exploration task conservatives were better at recalling and avoiding previously selected objects that had a negative utility (Shook and Fazio 2009). Based on this model, a further test of this prediction would be to compare the ability of liberals and conservatives to recall the identity of social violators across an immediate and an extended timescale. Examining the ability of individuals to recall violations over different timescales provides an indicator of the utility of the trait for social behaviour.

In conclusion, in this thesis I investigate the evolutionary influences to the liberal-conservative dimensions of the ideological spectrum. By better understanding the function of traits from our evolutionary history, as well as how these traits influence contemporary social interactions, I hope to contribute to the development of a more complete picture of the factors contributing to political differences such as differences in political attitudes. Consequently, the findings of this thesis that differences in sensitivity to positive and negative social cues associated with liberal and conservative orientations are meaningful to the outcomes of social interaction is an important step in the development of this complete causal picture.

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Section 1

Deception Protocol, Variable Coding, and Common Support

Deception Protocol:

During the experiment deception is utilized to manipulate participants' exposure to implicit social attitudes. The application of deception proceeds as follows. At the recruitment stage, participants are informed that they will be taking part in an experimental interaction that requires them to interact with another study participant. At the start of the study participants are also provided detailed instructions on the experimental interaction and again immediately prior to the interaction. Immediately prior to the interaction participants are asked if they understand the interaction; subjects who did not understand the interaction are screened out of the study. The instructions received immediately prior to the study are as follows.

Game Format:

Player 1 begins the game by deciding whether to take part in the interaction. If Player 1 chooses not to take part in the interaction the experiment ends, and both Players, 1 & 2, will receive a reward of \$4.00.

If Player 1 chooses to take part in the interaction, the total available funds are increased. However, how the total funds to be allocated to both Players, Players 1 & 2, will be decided by Player 2. Player 2 may choose between either an equal \$6.00-\$6.00 allocation, or an unequal \$2.00-\$10.00 distribution of the prize pool. Whatever option Player 2 selects will be awarded to each participant.

Do you understand the interaction?

After receiving the experimental instructions participants are prompted and asked to wait while they are connected with another survey participant. Participants are informed that this may take up to several minutes depending on the time of day. Participants experience a 42 second delay at which point they are told they have been matched with another study participant who is identified using a participant number. At this time participants are also informed that they have been randomly assigned to play as Player 1 during the interaction. After matching, participants proceed to the experimental interaction.

The experiment is composed of 6 treatments. Participants are randomly assigned to complete only one of the six treatments using block randomization of ideological affiliation by self-placement on a 7-point Left-Right Likert Scale (Left= 1-3, Neutral= 4, Right= 5-7).

Interaction:

If assigned to Treatment participants are now presented with a question or series of questions, which they are told are being presently answered by their partner. After reading these participants experience a 15 second delay and are then proceed to the interaction. In the case of the control condition participants experience proceed directly to the interaction after being matched with their partner.

During the interaction participants are asked the following question...

“having been matched with participant #####, and having considered all possible outcomes please answer the following question. Do you wish to engage in the interaction with participant #####?”

No, I don't want to do the interaction

Yes, I want to do the interaction

Section 2: Common Support

Demographic Variables

Age:

Age ranges from 18-82, and is coded as a continuous variable.

Education:

Education is listed on a 1-8 point scale, and is recoded into three tiers (Low, Moderate, High). Participants are asked to list what is the highest level of education they have achieved:

1. Grade School
2. Some High School
3. High School
4. Trade School
5. Some College
6. College Degree (Undergraduate)
7. Graduate School (Masters Degree)
8. Doctorate (PhD, M.D.)

Education is recoded into a 3-level categorical variable.

- 1-4 Low Education
- 5-6 Educated
- 7-8 Highly Educated

Ethnicity:

Participants were asked to declare their ethnicity across 8 categories:

1. Black (not of Hispanic Origin)
2. Hispanic
3. Asian
4. White
5. First Nation/Inuit,
6. Pacific Islander
7. Brown
8. Other

Ethnicity is coded into a binary categorical variable:

1. White
2. Non-White

Ethnicity is coded as a binary categorical variable into to maintain common support in all treatments.

Income:

Income is measured on an 10-point scale from

1. \$0-\$15,000
2. \$15,001-\$30,000
3. \$30,001-\$45,000
4. \$45,001-\$60,000
5. \$60,001-\$75,000
6. \$75,001-\$90,000
7. \$90,001-\$105,000
8. \$105,001-\$120,000
9. \$120,001-\$135,000
10. \$150,000-160,000

Income is coded as a continuous measure from 1-10

Religious Service Attendance:

Participants were asked to declare how often they attend religious services per month:

1. 0 times
2. 1-2 times
3. 3-4 times
4. 5-6 times,
5. 6 or more times

Due to the high percentage of liberal individuals who did not attend any religious services religious service was coded into a dichotomous categorical variable:

1. No attendance
2. Attendance

Sex

Participants were asked to indicate their sex, as either

1. Male
2. Female

Platform:

Participants are grouped according to the platform they are recruited from:

1. Amazon Mechanical Turk
2. Find Participants.com
3. Social Science.com

Common Support

Mean Age by Political Party.

Age	Obs.	Mean.	Std.
Age	2331	34.28	11.649
Age Democrat	1,261	34.16	11.491
Age Republican	553	35.59	11.796
Age Other	517	33.15	10.917

Annual Income Levels by Political Party.

Income	Democrat	Republican	Other	Total
\$0-\$15,000	273 21.65%	83 15.01%	140 27.08%	496 21.28%
\$15,001-\$30,000	291 23.08%	92 16.64%	145 28.05%	528 22.65%
\$30,001-\$45,000	228 18.08%	92 16.64%	78 15.09%	398 17.07%
\$45,001-\$60,000	158 12.53%	80 14.47%	48 9.28%	286 12.27%
\$60,001-\$75,000	107 8.49%	56 10.13%	29 5.61%	192 8.24%
\$75,001-\$90,000	82 6.50%	51 9.22%	30 5.80%	163 6.99%
\$90,0001-\$105,000	44 3.49%	39 7.05%	16 3.09%	99 4.25%
\$105,001-\$120,000	36 2.85%	20 3.62%	12 2.32%	68 2.92%
\$120,001-\$135,000	13 1.03%	16 2.89%	4 0.77%	33 1.42%
\$135,001-\$150,000	7 0.56%	6 1.08%	5 0.97%	18 0.77%
\$150,000+	22 1.74%	18 3.25%	10 1.93%	50 2.15%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Ethnicity by Political Party.

Ethnic	Democrat	Republican	Other	Total
White	856 67.88%	368 66.55%	367 70.99%	1,591 68.25%
Hispanic	81 6.42%	40 7.23%	22 4.26%	143 6.13%
Asian	185 14.67%	118 21.34%	86 16.63%	389 16.69%
Black	113 8.96%	11 1.99%	19 3.68%	143 6.13%
Other	26 2.06%	16 2.89%	23 4.45%	65 2.79%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Sex by Political Party.

Sex	Democrat	Republican	Other	Total
Male	555 44.01%	280 50.63%	238 46.03%	1,073 46.03%
Female	706 55.99%	273 49.37%	279 53.97%	1,258 53.97%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Service Attendance by Political Party.

Service	Democrat	Republican	Other	Total
No Attendance	861 68.28%	189 34.18%	360 69.63%	1,410 66.49%
Attendance	400 31.72%	364 65.82%	157 30.37%	921 39.51%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Education by Political Party.

Education	Republican	Republican	Other	Total
Basic	146 11.58%	77 13.92%	69 13.35%	292 12.53%
Intermediate	851 67.49%	379 68.54%	348 67.31%	1,578 67.70%
Advanced	264 20.94%	97 17.54%	100 19.34%	461 19.78%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Participants in each Treatment by Political Party.

Treatment	Democrat	Republican	Other	Total
1.Control	216 17.13%	96 17.36%	85 16.44%	397 17.03%
2. Liberal Implicit	223 17.68%	103 18.63%	87 16.83%	413 17.72%
3.Conservative Implicit	218 17.29%	86 15.55%	96 18.57%	400 17.16%
4.Right Political	174 13.80%	83 15.01%	72 13.93%	329 14.11%
5.Left Political	182 14.43%	79 14.29%	73 14.12%	334 14.33%
6.Sports-In	185 14.67%	76 13.74%	64 12.38%	325 13.94%
7.Sports-Out	63 5.00%	30 5.42%	40 7.74%	133 5.71%
Total	1,261 100.00%	553 100.00%	517 100.00%	2,331 100%

Participant Platform by Political Party.

Platform	Republican	Republican	Other	Total
mTurk	447 35.45%	255 46.11%	187 36.17%	889 38.14%
Find Participants	388 30.77%	160 28.93%	149 28.82%	697 29.90%
Social Sci	426 33.78%	138 24.95%	181 35.01%	745 31.96%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Sexual Orientation by Political Party.

Platform	Republican	Republican	Other	Total
Heterosexual	1,090 86.44%	525 94.94%	454 87.81%	2,069 88.76%
Homosexual	67 5.31%	15 2.71%	13 2.51%	95 4.08%
Bisexual	104 8.25%	13 2.35%	50 9.67%	167 7.16%
Total	1,261 100%	553 100%	517 100%	2,331 100%

Ideological Orientation: 7-point Liberal-Conservative Likert Scale

7-point Likert Scale	Democrat	Percent
7. Very Liberal	290	12.44%
6. Liberal	558	23.94%
5. Moderate Liberal	403	17.29%
4. Neutral	531	22.78%
3. Moderate Conservative	267	11.45%
2. Conservative	215	9.22%
1. Very Conservative	67	2.87%
Total	2,331	100.00%

Ideological Orientation: 7-point Left-Right Likert Scale

7-point Likert Scale	Democrat	Percent
7. Very Left	253	10.85%
6. Left	482	20.68%
5. Moderate Left	395	16.95%
4. Neutral	551	23.64%
3. Moderate Right	244	10.47%
2. Right	251	10.77%
1. Very Right	155	6.65%
Total	2,331	100.00%

Ideological Orientation: Political Party Affiliation

Political Party	Democrat	Percent
Democrat	1,261	54.10%
Republican	553	23.72%
Other	517	22.18%
Total	2,331	100.00%

Time and Date of Experimental Trails

Times	Dates	Participant Pool	Participants
1.	Oct 30 th	Social Sci	191
2.	Nov 15 th - Nov 16 th	Social Sci	233
3.	Dec 1 st – 5 th Dec 7 th -9 th	Find Part & Social Sci	327
4.	Jan 6 th 7 th	mTurk	338
5.	Feb 28 th	Social Sci	144
6.	March 18 th	Social Sci	33
7.	March 29 th -30 th	mTurk	176
8.	April 15 th	mTurk	208
9.	May 1 st	mTurk	78
10.	May 9 th	Find Part	167
11.	May 31 st June 1 st	mTurk	89
12.	June 1 st -June 6 th	Find Part	346
Total	2,331	100.00	2,331

Openness by Political Party.

Personality	Democrat	Republican	Other	Total
2.	4 0.32%	1 0.18%	3 0.58%	8 0.34%
3.	5 0.40%	7 1.27%	1 0.19%	13 0.56%
4.	14 1.11%	10 1.81%	7 1.35%	31 1.33%
5.	12 0.95%	25 4.52%	6 1.16%	43 1.84%
6.	30 2.39%	27 4.88%	22 4.26%	79 3.39%
7.	71 5.63%	55 9.95%	25 4.84%	151 6.48%
8.	163 12.93%	112 20.25%	68 13.15%	343 14.71%
9.	126 9.99%	84 15.19%	57 11.03%	267 11.45%
10.	163 12.93%	58 10.49%	65 12.57%	286 12.27%
11.	185 14.67%	44 7.96%	68 13.15%	297 12.74%
12.	202 16.02%	58 10.49%	70 13.54%	330 14.16%
13.	123 9.75%	41 7.41%	68 13.15%	232 9.95%
14.	163 12.93%	31 5.61%	57 11.03%	251 10.77%
Total	1,261 100.00%	553 100.00%	517 100.00%	2,331 100%

Extraversion by Political Party.

Personality	Democrat	Republican	Other	Total
2.	88 6.98%	24 4.34%	37 7.16%	149 6.39%
3.	80 6.34%	27 4.88%	36 6.96%	143 6.13%
4.	121 9.60%	37 6.69%	60 11.61%	218 9.35%
5.	104 8.25%	59 10.67%	45 8.70%	208 8.92%
6.	129 8.25%	45 8.14%	47 9.09%	221 9.48%
7.	113 8.96%	60 10.85%	52 10.06%	225 9.65%
8.	161 12.77%	85 15.37%	78 15.09%	324 13.90%
9.	122 9.67%	77 13.92%	35 6.77%	234 10.04%
10.	85 6.74%	48 8.68%	39 7.54%	172 7.38%
11.	90 6.11%	22 3.98%	33 6.38%	145 6.22%
12.	77 6.11%	32 5.79%	26 5.03%	135 5.79%
13.	44 3.49%	13 2.35%	15 2.90%	72 3.09%
14.	47 3.73%	24 4.34%	14 2.71%	85 3.65%
Total	1,261 100.00%	553 100.00%	517 100.00%	2,331 100%

Conscientiousness by Political Party.

Personality	Democrat	Republican	Other	Total
2.	4 0.32%	0 0.00%	4 0.77%	8 0.34%
3.	4 0.32%	1 0.18%	3 0.58%	8 0.34%
4.	19 1.51%	4 0.72%	12 2.32%	35 1.50%
5.	25 1.98%	9 1.63%	11 2.13%	45 1.93%
6.	49 3.89%	18 3.25%	12 2.32%	79 3.39%
7.	82 6.50%	40 7.23%	33 6.38%	155 6.65%
8.	140 11.10%	69 12.48%	53 10.25%	262 11.24%
9.	128 10.15%	49 8.86%	50 9.67%	227 9.74%
10.	132 10.47%	52 9.40%	62 11.99%	246 10.55%
11.	141 11.18%	69 12.48%	79 15.28%	289 12.40%
12.	198 15.70%	91 16.46%	77 14.89%	366 15.70%
13.	149 11.82%	70 12.66%	53 10.25%	272 11.67%
14.	190 15.07%	81 14.65%	68 13.15%	339 14.54%
Total	1,261 100.00%	553 100.00%	517 100.00%	2,331 100%

Agreeableness by Political Party.

Personality	Democrat	Republican	Other	Total
2.	3 0.24%	0 0.00%	1 0.19%	4 0.17%
3.	4 0.32%	0 0.00%	4 0.77%	8 0.34%
4.	22 1.74%	7 1.27%	10 1.93%	39 1.67%
5.	13 1.03%	6 1.08%	7 1.35%	26 1.12%
6.	36 2.85%	30 5.42%	26 5.03%	92 3.95%
7.	75 5.95%	44 7.96%	32 6.19%	151 6.48%
8.	156 12.37%	97 17.54%	68 13.15%	321 13.77%
9.	129 10.23%	64 11.57%	59 11.41%	252 10.81%
10.	153 12.13%	48 8.68%	64 12.38%	265 11.37%
11.	165 13.08%	61 11.03%	69 13.35%	295 12.66%
12.	198 15.70%	90 16.27%	85 16.44%	373 16.00%
13.	160 12.69%	66 11.93%	50 9.67%	276 11.84%
14.	147 11.66%	40 7.23%	42 8.12%	229 9.82%
Total	1,261 100.00%	553 100.00%	517 100.00%	2,331 100%

Emotional Stability by Political Party.

Personality	Democrat	Republican	Other	Total
2.	16 1.27%	4 0.72%	6 1.16%	26 1.12%
3.	23 1.82%	5 0.90%	9 1.74%	37 1.59%
4.	35 2.78%	11 1.99%	11 2.13%	57 2.45%
5.	46 3.65%	12 2.17%	32 6.19%	90 3.86%
6.	88 6.98%	36 6.51%	32 6.19%	156 6.69%
7.	105 8.33%	41 7.41%	53 10.25%	199 8.54%
8.	160 12.69%	80 14.47%	71 13.73%	311 13.34%
9.	146 11.58%	69 12.48%	45 8.70%	260 11.15%
10.	147 11.66%	62 11.21%	49 9.48%	258 11.07%
11.	127 10.07%	64 11.57%	58 11.22%	249 10.68%
12.	141 11.18%	78 14.10%	67 12.96%	286 12.27%
13.	103 8.17%	43 7.78%	35 6.77%	181 7.76%
14.	124 11.66%	48 8.68%	49 9.48%	221 9.48%
Total	1,261 100.00%	553 100.00%	517 100.00%	2,331 100%

Participants in each Treatment by Response No vs. Yes

Treatment	T1.	T2.	T3.	T4.	T5.	T6.	T7.
1.No	134 33.84%	85 20.73%	145 35.98%	113 34.35%	81 24.32%	79 25.55%	59 42.75
2.Yes	262 66.16%	325 79.27%	258 64.02%	216 65.65%	252 75.68%	138 74.45%	79 57.25%
Total	396 100%	410 100%	403 100%	329 100%	333 100%	59 100%	138 100%

Section 3: Test of Model and Covariate Fit

Wald Test of Continuous Covariates:

Model Variable	PolParty Chi2	PolParty Prob > Chi2
Openness	6.60	0.010**
Extraversion	10.53	0.0012**
Agreeableness	0.25	0.6185
Conscientiousness	9.00	0.0027
Emotional Stability	0.43	0.5138
Income	11.76	0.0005
Age	3.55	0.0595
Time	15.03	0.0001

Likelihood-ratio Test Categorical Covariates:

Model Variable	PolParty Chi2	PolParty Prob > Chi2
Education	8.64	0.0133**
Sex	5.69	0.0170**
Service Attendance	14.05	0.0002***
Ethnicity	5.84	0.0157**
Orient	3.42	0.1813
Orient*Pol	10.75	0.0965
PTest	36.81	0.0000***

Hosmer-Lemeshew, L-Fit, Iroc Tests of Model Fit:

Model	Model A Odds Ratio	Model B Odds Ratio	Model B Odds Ratio	Model D Odds Ratio
LC Model				
Group 14	5.68	13.96	12.61	19.42
	0.9315	0.3034	0.3981	0.0789
Groups 12	7.05	6.31	16.70	11.92
	0.7204	0.7889	0.0813	0.2904
Groups 10	3.45	11.23	13.34	10.19
	0.9031	0.1891	0.1008	0.2520
Groups 8	2.36	4.15	5.40	11.46
	0.8841	0.6563	0.4940	0.0751
L-fit Test	64.26	2280.42	2325.42	2333.78
	0.0088	0.2909	0.2778	0.2338
I-Roc Test	0.6363	0.6598	0.6719	0.6983

Hosmer-Lemeshew Significance = (P>0.050)

L-Fit Significance = (P>0.050)

I-Roc Significance = (P> 0.6 - P<0.9)

Regression Model Covariance Tables

	<u>PolParty</u>	<u>Orient</u>	<u>Sex</u>	<u>Educate</u>	<u>Income</u>	<u>Age</u>	<u>Service</u>	<u>Ethnic</u>	<u>PTest</u>
PolParty	1.0000								
Orient	-0.0244	1.0000							
Sex	-0.0270	0.0834	1.0000						
Educate	-0.0309	0.0294	0.0073	1.0000					
Income	-0.0123	-0.0954	-0.0099	0.2087	1.0000				
Age	-0.0201	-0.0753	0.1029	0.0527	0.1262	1.00000			
Service	0.0550	-0.0640	-0.0388	0.0953	0.1422	0.0159	1.0000		
Ethnic	0.0357	0.0293	-0.0990	0.1163	-0.0135	-0.1671	0.2918	1.0000	
PTest	-0.0196	-0.0432	0.0482	0.0059	0.1139	-0.0759	-0.1073	-0.1379	1.0000
Extra	-0.0257	-0.0489	0.0519	0.0715	0.1525	0.0911	0.1681	0.1079	-0.0391
Agree	-0.0715	-0.0426	0.1513	0.0266	0.0081	0.1749	0.0584	-0.0375	-0.1073
Emotion	-0.0047	-0.1505	-0.1074	0.0456	0.1238	0.1650	0.0824	0.0249	-0.1187
Open	-0.0644	0.0601	0.1105	0.0549	-0.0435	0.0317	-0.0870	-0.0626	-0.0288
Consc	-0.0122	-0.1055	0.0700	0.0626	0.0552	0.1238	0.0235	-0.0350	-0.0605
Time	0.0031	-0.0259	0.0228	-0.0495	-0.0356	0.0968	-0.0145	-0.0322	-0.4077

	<u>Extra</u>	<u>Agree</u>	<u>Emotion</u>	<u>Open</u>	<u>Consc</u>	<u>Time</u>
PolParty						
Orient						
Sex						
Educate						
Income						
Age						
Service						
Ethnic						
PTest						
Extra	1.0000					
Agree	0.1140	1.0000				
Emotion	0.2094	0.3574	1.0000			
Open	0.2543	0.3282	0.2201	1.0000		
Consc	0.1499	0.3473	0.4031	0.2385	1.0000	
Time	0.0388	0.0984	0.0952	0.0079	0.0796	1.0000

Section 4

Correlations Between Ideological Orientation and Political Party

Table 1: Logistic Regression of Increasing Score on the Implicit Attitude Measure and Odds of Having Democrat vs. Republican Party Affiliation. Higher Scores Predict a Republican Orientation

Con-Lib Preference	Coef.	Std. Err	Z.	P> z	95% Conf. Interval
Works Sum	1.538	0.035	19.05	0.000	1.471 1.608
cons	0.019	0.004	-21.33	0.000	0.013 0.027

Works Sum is a continuous measure of implicit social attitudes scored on a 14-28 point scale. Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.0

Table 2: Logistic Regression of Increasing Score on Implicit Attitude Social Cues and Odds of having Democrat vs. Republican Party Affiliation. Higher Scores Predict a Republican Orientation

Con-Lib Preference	Coefficient	Std. Err	Z.	P> z	95% Conf. Interval
Works Cue	1.825	0.059	18.76	0.000**	1.714 1.944
cons	.031	0.005	-21.50	0.000	0.022 0.042

Works Cue is continuous measure of individuals' response to implicit attitudes questions used as cues in Treatments 2 & 3. Works Cues is scored on a 1-8 scale. Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.0

Table 3: Logistic Regression of Increasing Scores on Liberal-Conservative and Left-Right Self-Report Ideology and Odds of Being Democrat vs. Republican. Self Orientation is Measured on a 7-Point Likert Scale

Model	Odds Ratio	Std. Err	Z.	P> z	95% Conf. Interval
Lib-Con	2.008	0.103	13.58	0.000***	1.816 2.220
Left-Right	1.761	0.086	11.61	0.000***	1.608 1.938
cons	.003	.001	-22.34	0.000	0.002 0.005

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.0

Section 5

Overall Trust

Table 4: Overall Levels of Cooperation in each Treatment Compared to Control.

Variable	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.982	.064	0.000***	1.860 2.112
Treatment 3	.868	.211	0.561	0.538 1.400
Treatment 4	.968	.508	0.951	0.346 2.709
Treatment 5	1.622	.801	0.327	0.616 4.270
Treatment 6	1.535	.668	0.325	0.654 3.601
Treatment 7	.658	.321	0.390	0.253 1.711
Find Participants	1.772	.182	0.000	1.448 2.168
SocialSci	1.790	.180	0.000	1.469 2.180
cons	1.401	.392	0.229	0.809 2.428

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 5: Difference in Levels of Trust In Control Treatment by Political Dimension

Model	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Pol-Other	.809*** (0.038)	.798*** (0.191)	.789** (0.062)	.811*** (0.049)
Pol-Republican	1.546*** (0.095)	1.267*** (0.086)	1.372*** (0.054)	1.390*** (0.030)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Lincom Function Tables for Logistic Regression Models

Table 6. Within Subject Effects: Comparing Odds of Trust in Democrats in Each Treatment to Democrats in Control Treatment

Model Pol Party Democrat	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Treatment 2	2.573*** (0.532)	2.595*** (0.610)	2.616*** (0.649)	2.682*** (0.711)
Treatment 3	.755 (0.230)	.723 (0.243)	.721 (0.231)	.714 (0.233)
Treatment 4	1.045 (0.472)	1.111 (0.527)	1.170 (0.498)	1.383 (0.424)
Treatment 5	2.246 (1.212)	2.503* (1.426)	2.621* (1.436)	3.106** (1.176)
Treatment 6	1.506 (0.558)	1.579 (0.679)	1.583 (0.613)	1.932** (0.607)
Treatment 7	.630 (0.328)	.697 (0.400)	.736 (0.398)	.862 (0.324)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 7: Between Subject Effects: Comparing Odds of Trust in Democrats to Republicans in each Treatment

Model Pol Party Republican	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Treatment 2	1.896** (0.445)	2.262*** (0.459)	2.212*** (0.001)	2.158** (0.533)
Treatment 3	0.629** (0.149)	0.741 (0.160)	0.708* (0.146)	0.692 (0.162)
Treatment 4	0.980 (0.407)	1.066 (0.508)	0.953 (0.461)	0.991 (0.475)
Treatment 5	1.772*** (0.309)	2.163*** (0.362)	2.020*** (0.289)	2.052*** (0.318)
Treatment 6	0.920 (0.314)	0.985 (0.324)	0.906 (0.274)	0.897 (0.264)
Treatment 7	0.975 (0.229)	1.098 (0.248)	0.971 (0.239)	0.951 (0.207)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 8: Comparing Levels of Trust in Republicans to Republicans in Control Treatment

Model Pol Party Republican	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Treatment 2	.878** (0.048)	.906** (0.043)	.862*** (0.023)	.894*** (0.020)
Treatment 3	.776 (0.207)	.770 (0.181)	.742 (0.202)	.743 (0.209)
Treatment 4	.689 (0.520)	.823 (0.650)	.894 (0.696)	1.004 (0.550)
Treatment 5	.820 (0.545)	.913 (0.579)	.946 (0.591)	1.089 (0.486)
Treatment 6	1.059 (0.329)	1.266 (0.472)	1.274 (0.439)	1.549** (0.215)
Treatment 7	.418** (0.141)	.501* (0.060)	.552* (0.174)	.652** (0.102)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 9: Within Subject Effects: Comparing the Effect of Implicit Attitudes vs. Shared Identity on Odds of Trust

Model	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Democrats 2 vs. 6	1.708*** (0.281)	1.643** (0.324)	1.653*** (0.231)	1.388** (0.205)
Republicans 3 vs. 6	.733 (0.350)	.608 (0.308)	.583 (0.265)	.479** (0.140)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 10: Within Subject Effects: Comparing the Effect of Implicit Attitudes vs. Shared Political Identity on Odds of Trust

Model	Model A Odds Ratio	Model B Odds Ratio	Model C Odds Ratio	Model D Odds Ratio
Democrats 2 vs. 5	1.146 (0.406)	1.037 (0.491)	.998 (0.324)	.863 (0.098)
Republicans 3 vs. 4	1.126 (0.916)	.935 (0.798)	.830 (0.667)	.739 (0.416)

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Lincom Function Tables for Implicit Attitude Models

Table 10: Within-Subject Effects by Score on the Five Implicit Attitudes Dimensions

Model	Moral Code Odds Ratio	Outgroup Odds Ratio	Role of Group Odds Ratio	Leadership Odds Ratio	Absolute Odds Ratio
Treat 2. Cat 1	3.744*** (0.271)	17.481*** (11.647)	3.668*** (0.886)	2.236*** (0.142)	2.794*** (0.643)
Treat 2. Cat 2	.777 (0.196)	2.289* (0.989)	1.773*** (0.190)	1.693* (0.491)	1.464* (0.312)
Treat 2. Cat 3	1.151 (0.606)	1.640** (0.397)	2.457*** (0.461)	1.109 (0.245)	1.229 (0.317)
Treat 2. Cat 4	.839** (0.062)	.896** (0.050)	.739* (0.115)		
Treat 2. Cat 5		2.121*** (0.432)			
Treat 3. Cat 1	.961 (0.354)	1.196 (0.749)	.826 (0.115)	.690 (0.215)	1.115 (0.132)
Treat 3. Cat 2	.475 (0.252)	.639 *** (0.083)	.799 (0.360)	1.202 *** (0.054)	.859 (0.146)
Treat 3. Cat 3	.711 (0.277)	.729 (0.239)	1.080 (0.378)	1.019 (0.165)	1.011 (0.224)
Treat 3. Cat 4	.952 (0.415)	.673 * (0.158)	.734 (0.184)		
Treat 3. Cat 5		1.707** (0.305)			
Treat 4. Cat 1	1.075 (0.466)	1.160 (0.880)	.803 (0.326)	1.019 (0.604)	1.026 (0.599)
Treat 4. Cat 2	.668 (0.544)	.737 (0.297)	.881 (0.537)	1.104 (0.546)	1.072 (0.232)
Treat 4. Cat 3	.850 (0.883)	.984 (0.582)	1.943 (1.285)	.619 (0.317)	.532 (0.610)
Treat 4. Cat 4	.805 (0.147)	.863 (0.521)	.606 (0.372)		
Treat 4. Cat 5		1.392 (0.681)			

Treat 5. Cat 1	2.069 (1.105)	2.813 (3.452)	2.814 (1.898)	1.923 (1.116)	1.677 (1.060)
Treat 5. Cat 2	1.576 (0.966)	1.474 (1.041)	1.130 (0.749)	1.272* (0.182)	1.670 (0.595)
Treat 5. Cat 3	1.074 (0.852)	1.774 (1.009)	3.086** (1.326)	.952 (1.319)	1.163 (0.708)
Treat 5. Cat 4	.762* (0.120)	1.236 (0.298)	.669 (0.193)		
Treat 5. Cat 4		1.689 (0.837)			
Treat 6. Cat 1	1.689 (0.693)	2.374 (1.892)	1.386 (0.609)	1.498 (0.718)	1.235 (0.490)
Treat 6. Cat 2	1.225 (1.272)	1.141 (0.356)	1.372 (0.996)	1.747 (0.806)	2.163* (0.980)
Treat 6. Cat 3	1.813 (1.561)	1.514 (0.420)	2.792* (1.491)	1.574 (1.268)	1.774 (0.780)
Treat 6. Cat 4	1.010 (0.309)	1.243 (0.710)	.975 (0.076)		
Treat 6. Cat 4.		2.293* (1.086)			
Treat 7. Cat 1	1.484 (1.051)	.762 (0.808)	.690 (0.244)	.770 (0.455)	.937 (0.439)
Treat 7. Cat 2	.118 *** (0.056)	.691 (0.281)	.515 (0.511)	.615 (0.254)	.403 * (0.199)
Treat 7. Cat 3	.324 (0.295)	.463 (0.391)	1.045 (0.752)	.219 ** (0.171)	.495 (0.304)
Treat 7. Cat 4	.420 (0.242)	.574 (0.290)	.443 *** (0.029)		
		1.092 (0.118)			

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Lincom Tables for Personality Regression Models

Table 11: Logistic Regression of the Interaction Between Treatment and Extraversion on Trust.

Model	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.710	0.503	0.068	0.961 3.042
Treatment 3	1.044	0.095	0.638	0.873 1.248
Treatment 4	.630	0.442	0.510	0.159 2.491
Treatment 5	1.016	0.814	0.984	0.211 4.886
Treatment 6	2.509	1.003	0.021	1.147 5.493
Treatment 7	.873	0.515	0.818	0.275 2.772
Extra	1.044	0.028	0.110	0.990 1.101
T2 Extra	1.021	0.038	0.574	0.950 1.097
T3 Extra	.975	0.035	0.471	0.909 1.045
T4 Extra	1.062	0.043	0.133	0.982 1.150
T5 Extra	1.068	0.076	0.346	0.931 1.228
T6 Extra	.937	0.049	0.213	0.845 1.038
T7 Extra	.963	0.078	0.636	0.822 1.127
Find Participants	1.771	0.189	0.000	1.436 2.183
Social Sci	1.818	0.196	0.000	1.471 2.246
cons	1.017	0.277	0.951	0.596 1.734

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 12: Effect of Extraversion on Trust in each Treatment Compared to Extraverts in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	1.044	0.028	0.110	0.990 1.101
Treatment 2	1.066	0.014	0.000***	1.039 1.093
Treatment 3	1.018	0.033	0.592	0.955 1.093
Treatment 4	1.109	0.030	0.000***	1.052 1.169
Treatment 5	1.116	0.059	0.038**	1.006 1.237
Treatment 6	.978	0.026	0.390	0.929 1.029
Treatment 7	1.005	0.054	0.929	0.904 1.117

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 13: Logistic Regression of the Interaction Between Treatment and Openness to Experience on Trust.

Model	Coef.	Std. Err	P> z	Conf Int
Treatment 2	.572	0.129	0.013	0.368 0.888
Treatment 3	.734	0.303	0.453	0.327 1.647
Treatment 4	.398	0.368	0.320	0.065 2.440
Treatment 5	.396	0.510	0.472	0.032 4.949
Treatment 6	.847	0.877	0.873	0.111 6.448
Treatment 7	.547	0.526	0.530	0.083 3.599
Open	.980	0.007	0.005	0.967 0.994
T2 Open	1.132	0.030	0.000	1.074 1.193
T3 Open	1.017	0.040	0.678	0.940 1.099
T4 Open	1.093	0.042	0.021	1.014 1.178
T5 Open	1.153	0.099	0.098	0.974 1.366
T6 Open	1.060	0.064	0.330	0.943 1.192
T7 Open	1.019	0.061	0.759	0.906 1.146
Find Participants	1.731	0.164	0.000	1.437 2.085
Social Sci	1.766	0.198	0.000	1.418 2.200
cons	1.734	0.600	0.111	0.881 3.416

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 14: Effect of Openness on Trust in each Treatment Compared to Openness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.980	0.007	0.005**	0.967 0.994
Treatment 2	1.109	0.033	0.001***	1.046 1.176
Treatment 3	.996	0.040	0.929	0.922 1.077
Treatment 4	1.071	0.037	0.047**	1.001 1.147
Treatment 5	1.130	0.097	0.154	0.955 1.337
Treatment 6	1.039	0.059	0.501	0.929 1.162
Treatment 7	.998	0.062	0.978	0.885 1.127

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 15: Logistic Regression of the Interaction Between Treatment and Conscientiousness on Trust.

Model	Coef.	Std. Err	P> z	Conf Int
Treatment 2	.914	0.602	0.891	0.251 3.324
Treatment 3	.725	0.124	0.060	0.518 1.014
Treatment 4	.479	0.161	0.028	0.249 0.925
Treatment 5	.437	0.209	0.084	0.171 1.116
Treatment 6	1.749	1.412	0.489	0.359 8.512
Treatment 7	.272	0.391	0.365	0.016 4.534
Consc	.913	0.028	0.003	0.859 0.969
T2 Consc	1.077	0.069	0.243	0.951 1.221
T3 Consc	1.017	0.035	0.619	0.951 1.088
T4 Consc	1.072	0.023	0.001	1.028 1.118
T5 Consc	1.134	0.032	0.000	1.074 1.198
T6 Consc	.993	0.038	0.864	0.921 1.072
T7 Consc	1.089	0.111	0.401	0.892 1.330
Find Participants	1.727	0.133	0.000	1.485 2.009
Social Sci	1.758	0.194	0.000	1.416 2.183
cons	3.652	2.068	0.022	1.204 11.080

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 16: Effect of Conscientiousness on Trust in each Treatment Compared to Conscientiousness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.913	0.028	0.003**	0.859 0.969
Treatment 2	.983	0.076	0.826	0.845 1.144
Treatment 3	.928	0.044	0.116	0.846 1.019
Treatment 4	.978	0.042	0.611	0.898 1.065
Treatment 5	1.035	0.058	0.536	0.928 1.155
Treatment 6	.907	0.013	0.000***	0.882 0.931
Treatment 7	.994	0.071	0.934	0.863 1.145

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 17: Logistic Regression of the Interaction between Treatment and Agreeableness on Trust.

Model	Coef.	Std. Err	P> z	Conf Int
Treatment 2	.957	0.177	0.813	0.666 1.376
Treatment 3	1.174	0.845	0.823	0.287 4.808
Treatment 4	1.530	0.618	0.292	0.693 3.375
Treatment 5	3.226	1.464	0.010	1.325 7.853
Treatment 6	1.819	1.575	0.490	0.333 9.924
Treatment 7	0.443	0.398	0.365	0.076 2.574
Agreeability	1.012	0.016	0.447	0.981 1.044
T2 Agreeability	1.077	0.021	0.000	1.037 1.118
T3 Agreeability	.970	0.046	0.527	0.884 1.065
T4 Agreeability	.957	0.045	0.356	0.872 1.050
T5 Agreeability	.937	0.018	0.001	0.902 0.973
T6 Agreeability	.984	0.041	0.692	0.906 1.068
T7 Agreeability	1.038	0.084	0.646	0.886 1.216
Find Participants	1.782	0.184	0.000	1.455 2.183
Social Sci	1.809	0.189	0.000	1.473 2.221
cons	13.970	0.513	0.609	0.548 2.786

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 18: Effect of Agreeableness on Trust in each Treatment Compared to Agreeableness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	1.012	0.016	0.447	0.981 1.044
Treatment 2	1.090	0.036	0.009**	1.021 1.163
Treatment 3	.982	0.031	0.571	0.923 1.045
Treatment 4	.989	0.047	0.508	0.882 1.064
Treatment 5	.948	0.019	0.009**	0.911 0.987
Treatment 6	.995	0.028	0.870	0.942 1.052
Treatment 7	1.050	0.098	0.600	0.874 1.261

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 19: Logistic Regression of the Interaction between Treatment and Emotional Stability on Trust.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	4.441	1.275	0.000	2.530 7.797
Treatment 3	.904	0.199	0.649	0.588 1.393
Treatment 4	1.134	0.320	0.662	0.650 1.970
Treatment 5	1.134	0.578	0.804	0.418 3.078
Treatment 6	3.550	0.313	0.000	2.986 4.220
Treatment 7	1.014	1.017	0.989	0.142 7.245
Emotion Stability	1.027	0.048	0.570	0.937 1.126
T2 Emotion Stability	.918	0.029	0.925	0.863 0.977
T3 Emotion Stability	.996	0.042	0.741	0.916 1.082
T4 Emotion Stability	.983	0.073	0.152	0.849 1.138
T5 Emotion Stability	1.037	0.062	0.355	0.922 1.166
T6 Emotion Stability	.918	0.036	0.349	0.851 0.991
T7 Emotion Stability	.955	0.132	0.119	0.728 1.253
Find Participants	1.786	0.192	0.000	1.447 2.205
Social Sci	1.783	0.169	0.000	1.481 2.147
cons	1.093	1.759	0.788	0.573 2.085

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 20: Affect of Emotional Stability on Trust in each Treatment Compared to Emotional Stability in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	1.027	0.048	0.570	0.937 1.126
Treatment 2	.943	0.016	0.000***	0.913 0.975
Treatment 3	1.023	0.006	0.000***	1.011 1.034
Treatment 4	1.009	0.045	0.836	0.925 1.102
Treatment 5	1.065	0.017	0.000***	1.032 1.098
Treatment 6	.943	0.030	0.065*	0.886 1.004
Treatment 7	.981	0.090	0.834	0.819 1.174

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 21: Logistic Regression of the Score on the "Big 5" Personality Traits and the Probability of Being Democrat vs. Republican. Democrat = 0, Republican = 1.

Variable	Coef.	Std. Err	P> z	Conf Int
Openness	-.236	0.024	0.000***	-0.284 -0.189
Extraversion	0.068	0.018	0.000***	0.033 0.103
Conscientiousness	.056	0.024	0.016**	0.011 0.101
Agree	-.048	0.024	0.043**	-0.094 -0.001
Emotion Stability	.067	0.022	0.002**	0.024 0.109
Cons	.259	0.298	0.383	-0.326 0.844

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Full Statistical Regression Models: Model A-D

Table 23: Logistic Regression of Trust in Treatment by Political Orientation. Model A

Variable	Coef.	Std. Err	P> z	Conf Int
Treatment 2	2.573	0.532	0.000	1.715 3.859
Treatment 3	.755	0.231	0.357	0.415 1.374
Treatment 4	1.045	0.472	0.923	0.431 2.531
Treatment 5	2.246	1.212	0.134	0.780 6.466
Treatment 6	1.506	0.558	0.269	0.728 3.115
Treatment 7	.630	0.328	0.374	0.227 1.746
Republican	1546	0.096	0.000	1.370 1.744
Other	0.809	0.038	0.000	0.738 0.887
T2 Cat 2	.341	0.080	0.000	0.216 0.539
T2 Cat 3	1.125	0.328	0.687	0.635 1.992
T3 Cat 2	1.028	0.287	0.920	0.600 1.776
T3 Cat 3	1.867	0.219	0.000	1.483 2.351
T4 Cat 2	.660	0.240	0.254	0.323 1.347
T4 Cat 3	1.072	0.191	0.697	0.756 1.520
T5 Cat 2	.365	0.048	0.000	0.282 0.473
T5 Cat 3	.723	0.180	0.194	0.444 1.179
T6 Cat 2	.703	0.202	0.220	0.400 1.234
T6 Cat 3	1.614	1.018	0.448	0.469 5.553
T7 Cat 2	.664	0.140	0.051	0.439 1.003
T7 Cat 3	1.680	0.260	0.001	1.240 2.274
Find Participants	1.779	0.150	0.000	1.508 2.099
Social Sci	1.778	0.189	0.000	1.443 2.189
cons	1.331	0.403	0.345	0.735 2.410

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 24: Logistic Regression of Trust in Treatment by Political Orientation. Model B

Variable	Coef.	Std. Err	P> z	Conf Int
Treatment 2	2.587	0.574	0.000	1.675 3.997
Treatment 3	.733	0.230	0.322	0.396 1.355
Treatment 4	1.093	0.510	0.849	0.438 2.726
Treatment 5	2.606	1.433	0.081	0.888 7.654
Treatment 6	1.624	0.674	0.243	0.720 3.664
Treatment 7	.712	0.401	0.547	0.236 2.149
Republican	1.242	0.082	0.001	1.092 1.414
Other	0.785	0.038	0.000	0.714 0.863
T2 Cat 2	.353	0.815	0.625	0.215 0.581
T2 Cat 3	1.087	0.385	0.375	0.586 2.016
T3 Cat 2	1.090	0.870	0.056	0.645 1.843
T3 Cat 3	1.980	0.382	0.536	1.680 2.333
T4 Cat 2	.769	8.128	0.000	0.336 2.333
T4 Cat 3	1.125	0.372	0.000	0.820 1.543
T5 Cat 2	.370	0.701	0.715	0.286 0.479
T5 Cat 3	.680	0.612	0.887	0.396 1.170
T6 Cat 2	.816	0.422	0.602	0.420 1.583
T6 Cat 3	1.726	0.079	0.000	0.537 5.555
T7 Cat 2	.710	0.805	0.910	0.439 1.146
T7 Cat 3	1.608	1.248	0.733	1.353 1.911

Sex	1.310	0.075	0.000	1.171	1.465
Rep Homosexual	3.454	2.770	0.122	0.717	16.634
Rep Bisexual	.707	0.545	0.653	0.156	3.201
Other Homosexual	.582	0.142	0.026	0.362	0.937
Other Bisexual	1.783	0.525	0.050	1.001	3.175
Educate Middle	1.127	0.007	0.000	1.113	1.143
Educate Advanced	1.446	0.184	0.004	1.127	1.856
Income	1.051	0.042	0.212	0.972	1.136
Age	0.992	0.005	0.087	0.983	1.001
Service Attendance	1.441	0.297	0.076	0.962	2.159
Theft	1.068	0.029	0.017	1.012	1.127
Ethnic Non-White	1.303	0.176	0.050	0.999	1.699
Find Participants	1.749	0.117	0.000	1.535	1.994
Social Sci	1.815	0.248	0.000	1.389	2.371
Orient Homo	.811	0.208	0.414	0.491	1.340
Orient Bisexual	1.097	0.243	0.675	0.710	1.695
cons	.722	0.072	0.000	0.595	0.878

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 25: Logistic Regression of Trust in Treatment by Political Orientation. Model C

Variable	Coef.	Std. Err	P> z	Conf Int
Treatment 2	2.617	0.619	0.000	1.646 4.161
Treatment 3	.729	0.221	0.298	0.403 1.322
Treatment 4	1.145	0.490	0.752	0.495 2.648
Treatment 5	2.700	1.455	0.065	0.939 7.764
Treatment 6	1.612	0.619	0.213	0.760 3.421
Treatment 7	.744	0.404	0.586	0.257 2.155
Republican	1.242	0.054	0.000	1.247 1.458
Other	0.784	0.058	0.001	0.679 0.905
T2 Cat 2	.333	0.087	0.000	0.200 0.557
T2 Cat 3	1.100	0.390	0.789	0.549 2.204
T3 Cat 2	1.055	0.252	0.823	0.660 1.686
T3 Cat 3	1.994	0.143	0.000	1.733 2.294
T4 Cat 2	.784	0.348	0.584	0.329 1.871
T4 Cat 3	1.115	0.175	0.489	0.819 1.517
T5 Cat 2	.365	0.045	0.000	0.287 0.464
T5 Cat 3	.687	0.198	0.192	0.391 1.208
T6 Cat 2	.818	0.245	0.502	0.454 1.472
T6 Cat 3	1.908	1.102	0.263	0.616 5.916
T7 Cat 2	.744	0.187	0.238	0.455 1.216
T7 Cat 3	1.581	0.057	0.000	1.474 1.695

Sex	1.306	0.090	0.000	1.142	5.916
Rep Homosexual	3.286	2.679	0.145	0.665	16.242
Rep Bisexual	.709	0.621	0.695	0.127	3.943
Other Homosexual	.582	0.164	0.054	0.336	1.009
Other Bisexual	1.663	0.431	0.050	1.000	2.765
Extra	1.030	0.018	0.101	0.994	1.066
Agree2	1.006	0.012	0.654	0.982	1.030
EmotionS	1.012	0.100	0.233	0.992	1.032
Open	1.049	0.020	0.011	1.010	1.089
Consc	.936	0.027	0.023	0.883	0.991
Educate Middle	1.11	0.015	0.000	1.081	1.141
Educate Advanced	1.432	0.166	0.002	1.140	1.798
Income	1.049	0.040	0.215	0.973	1.131
Age	.992	0.005	0.109	0.982	1.002
Service Attendance	1.410	0.297	0.103	0.933	2.129
Theft	1.057	0.022	0.007	1.016	1.101
Ethnic Non-White	1.281	0.191	0.097	0.956	1.715
Find Participants	1.708	0.112	0.000	1.502	1.942
Social Sci	1.846	0.256	0.000	1.407	2.423
Orient Homo	.794	0.203	0.368	0.481	1.311
Orient Bisexual	1.081	0.281	0.764	0.650	1.800
cons	.637	0.222	0.196	0.321	1.262

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 26: Logistic Regression of Trust in Treatment by Political Orientation. Model D

Variable	Coef.	Std. Err	P> z	Conf Int
Treatment 2	2.682	0.675	0.000	1.638 4.393
Treatment 3	.723	0.223	0.294	0.395 1.325
Treatment 4	1.363	0.406	0.298	0.761 2.443
Treatment 5	3.237	1.169	0.001	1.595 6.571
Treatment 6	1.989	0.596	0.022	1.106 3.577
Treatment 7	.879	0.327	0.729	0.424 1.822
Republican	1.360	0.030	0.000	1.247 1.458
Other	0.807	0.042	0.000	0.679 0.905
T2 Cat 2	.339	0.086	0.000	0.206 0.559
T2 Cat 3	1.072	0.385	0.846	0.530 2.171
T3 Cat 2	1.072	0.267	0.779	0.658 1.746
T3 Cat 3	1.963	0.148	0.000	1.693 2.275
T4 Cat 2	.747	0.342	0.523	0.305 1.830
T4 Cat 3	1.119	0.195	0.519	0.795 1.574
T5 Cat 2	.356	0.055	0.000	0.263 0.481
T5 Cat 3	.670	0.186	0.148	0.389 1.153
T6 Cat 2	.820	0.242	0.500	0.460 1.461
T6 Cat 3	1.796	1.036	0.310	0.580 5.562
T7 Cat 2	.752	0.160	0.179	0.495 1.140
T7 Cat 3	1.551	0.158	0.000	1.271 1.893

Sex	1.354	0.051	0.000	1.258	1.458
Rep Homosexual	3.224	2.623	0.150	0.665	15.880
Rep Bisexual	.771	0.666	0.763	0.142	4.196
Other Homosexual	.553	0.172	0.057	0.301	1.017
Other Bisexual	1.631	0.413	0.053	0.994	2.679
Extra	1.031	0.019	0.103	0.994	1.068
Agree2	1.009	0.011	0.421	0.988	1.030
EmotionS	1.015	0.009	0.086	0.998	1.033
Open	1.046	0.021	0.026	1.005	1.089
Consc	.937	0.027	0.028	0.884	0.993
Educate Middle	1.122	0.031	0.000	1.063	1.185
Educate Advanced	1.442	0.185	0.004	1.122	1.854
Income	1.047	0.040	0.233	0.971	1.129
Age	.992	0.005	0.103	0.982	1.002
Service Attendance	1.395	0.299	0.120	0.917	2.124
Theft	1.063	0.020	0.001	1.025	1.102
Ethnic Non-White	1.296	0.189	0.075	0.974	1.723
Find Participants	2.013	0.096	0.000	1.833	2.211
Social Sci	1.418	0.202	0.014	1.073	1.874
Orient Homo	.835	0.204	0.460	0.518	1.346
Orient Bisexual	1.082	0.279	0.758	0.653	1.793
Time of Study	.932	0.018	0.000	0.897	0.967
cons	.877	0.291	0.693	0.458	1.680

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Section 6

Lincom and Marginal Effects Tables

Heterogeneous Regression Models: Democrat-Republican

Full Results of a Two-way interaction Between Ideology and Treatment on Odds of Trust in Each Statistical Model. Democratic is Coded as the Reference Category.

Model	A: Basic Model	B: Covariates	C: Personality	D: Time
Treatment 2	2.573*** (0.532)	2.595*** (0.610)	2.616*** (0.649)	2.682*** (0.711)
Treatment 3	.755 (0.230)	.723 (0.243)	.721 (0.231)	.714 (0.233)
Treatment 4	1.045 (0.472)	1.111 (0.527)	1.170 (0.498)	1.383 (0.523)*
Treatment 5	2.246 (1.212)	2.503 (1.426)	2.621* (0.613)	3.106** (1.176)
Treatment 6	1.506 (0.558)	1.579 (0.679)	1.583 (0.613)	1.932** (0.607)
Treatment 7	.630 (0.328)	.697 (0.400)	.736 (0.398)	.862 (0.324)
Other 2	0.809*** (0.038)	.798*** (0.191)	.789** (0.062)	.811*** (0.049)
Republican 3	1.546*** (0.095)	1.267*** (0.086)	1.372*** (0.054)	1.390*** (0.030)
T2 Other	1.125 (0.328)	1.064 (0.335)	1.085 (0.392)	1.058 (0.391)
T2 Rep	.341 (0.080)	.349 (0.092)	.329 (0.088)	.333 (0.088)
T3 Other	1.867 (0.219)	1.969 (0.133)	1.992 (0.128)	1.960 (0.130)
T3 Rep	1.028 (.287)	1.065 (0.300)	1.030 (0.253)	1.039 (0.263)
T4 Other	1.072 (0.191)	1.082 (0.164)	1.082 (0.159)	1.084 (0.176)
T4 Rep	.660 (0.240)	.741 (0.313)	.764 (0.341)	.726 (0.334)
T5 Other	.723 (0.180)	.690 (0.198)	.695 (0.204)	.679 (0.193)
T5 Rep	.365 (0.048)	.365 (0.042)	.361 (0.038)	.351 (0.047)
T6 Other	1.614 (1.018)	1.694 (0.970)	1.903 (1.051)	1.799 (0.988)
T6 Rep	.703 (0.202)	.802 (0.267)	.805 (0.235)	.802 (0.233)

T7 Other	1.680 (0.260)	1.534 (0.138)	1.523 (0.036)	1.495 (0.136)
T7 Rep	.664 (0.140)	.719 (0.192)	.751 (0.199)	.757 (0.172)
Platform Find Part	1.779*** (0.150)	1.791*** (0.142)	1.730*** (0.125)	2.026*** (0.107)
Platform Soc Sci	1.778*** (0.189)	1.836*** (0.231)	1.856** (0.241)	1.442** (0.197)
Sex	-----	1.255***	1.270*** (0.069)	1.312*** (0.034)
Demo "Gay"	-----	.836 (0.221)	.813 (0.216)	.853 (0.218)
Demo "Bisexual"	-----	1.154 (0.247)	1.122 (0.289)	1.127 (0.292)
Other*Gay	-----	.538** (0.138)	.546** (0.156)	.518** (0.163)
Other*Bisexual	-----	1.858* (0.618)	1.723* (0.492)	1.699* (0.483)
Rep*Gay	-----	3.575 (2.892)	3.322* (2.706)	3.255 (2.651)
Rep*Bisexual	-----	.800 (0.666)	.784 (0.726)	.856 (0.783)
Education College	-----	1.098*** (0.004)	1.085*** (0.022)	1.093** (0.035)
Education Grad+	-----	1.375** (0.199)	1.372** (0.173)	1.375** (0.189)
Income	-----	1.052 (0.042)	1.050 (0.040)	1.048 (0.040)
Age	-----	.992 (0.005)	.993 (0.006)	.992 (0.006)
Service Attendance	-----	1.400 (0.294)	1.381 (0.295)	1.364 (0.297)
Ethnicity	-----	1.263 (0.181)	1.246* (0.193)	1.257* (0.193)
Extra	-----	-----	1.030* (0.018)	1.031* (0.018)
Agree	-----	-----	.997 (0.015)	.999 (0.013)
Emotional Stability	-----	-----	1.014 (0.009)	1.017** (0.008)
Open	-----	-----	1.054** (0.009)	1.051** (0.023)
Consc	-----	-----	.930** (0.030)	.931** (0.030)

Time	-----	-----		.935*** (0.018)
Constant	1.331 (0.403)	.932 (0.029)	.855 (0.179)	1.193 (0.473)

*= P<0.100 **= P<0.05, ***= P<0.001

Full Lincom Function Tables

Democrat Political Party Preference

Comparing Trust in Democrats Compared to Democrats in Control Treatment

Model A

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treatment 2	2.573	.532	0.000	1.715 3.859
Treatment 3	.754	.230	0.357	.4150 1.373
Treatment 4	1.045	.472	0.923	.4313 2.531
Treatment 5	2.246	.472	0.134	.7799 6.466
Treatment 6	1.506	.558	0.269	.7285 3.115
Treatment 7	.630	.328	0.374	.2271 1.746

Comparing Trust in Democrats Compared to Democrats in Control Treatment

Model B

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treat 2 Full	2.595	.610	0.000	1.637 4.114
Treat 3 Full	.723	.243	0.334	.3735 1.398
Treat 4 Full	1.111	.527	0.824	.4391 2.813
Treat 5 Full	2.503	1.426	0.107	.8190 7.648
Treat 6 Full	1.579	.679	0.288	.6803 3.666
Treat 7 Full	.697	.400	0.529	.2262 2.147

Comparing Trust in Democrats Compared to Democrats in Control Treatment

Model C

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treat 2 Full	2.616	.649	0.000	1.609 4.255
Treat 3 Full	.721	.231	0.306	.3849 1.349

Treat 4 Full	1.170	.498	0.713	.5076	2.696
Treat 5 Full	2.621	1.436	0.079	.8956	7.671
Treat 6 Full	1.583	.613	0.236	.7410	3.382
Treat 7 Full	.736	.398	0.570	.2550	2.123

Comparing Trust in Democrats Compared to Democrats in Control Treatment

Model D

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	2.682	.711	0.000	1.595	4.509
Treat 3 Full	.714	.233	0.302	.3772	1.353
Treat 4 Full	1.383	.424	0.290	.7588	2.521
Treat 5 Full	3.106	1.176	0.003	1.479	6.522
Treat 6 Full	1.932	.607	0.036	1.044	3.576
Treat 7 Full	.862	.324	0.693	.4125	1.801

Between Subject Affects

Comparing Trust in Democrats to Republicans in each Treatment

Model A

<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treatment 2	1.896	.445	0.006**	1.197	3.005
Treatment 3	.629	.149	0.051**	.3949	1.002
Treatment 4	.980	.407	0.962	.4344	2.212
Treatment 5	1.772	.309	0.001	1.259	2.494
Treatment 6	.920	.314	0.808	.4721	1.795
Treatment 7	.975	.229	0.913	.616	1.544

Comparing Trust in Democrats to Republicans in each Treatment

Model B

<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	2.262	.459	0.000***	1.519	3.368
Treat 3 Full	.741	.160	0.165	.4856	1.131
Treat 4 Full	1.066	.508	0.894	.418	2.714
Treat 5 Full	2.163	.362	0.000	1.559	3.001
Treat 6 Full	.985	.324	0.962	.5162	1.878
Treat 7 Full	1.098	.248	0.680	.7047	1.710

Comparing Trust in Democrats to Republicans in each Treatment

<u>Model C</u>				
<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treat 2 Full				
Treat 3 Full	2.212	.532	0.001***	1.381 3.543
	.708	.146	0.095	.4718 1.061
Treat 4 Full	.953	.461	0.921	.3697 2.458
Treat 5 Full	2.020	.289	0.000	1.526 2.674
Treat 6 Full	.906	.274	0.744	.5000 1.640
Treat 7 Full	.971	.239	0.904	.5994 1.572

Comparing Trust in Democrats to Republicans in each Treatment

<u>Model D</u>				
<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treat 2 Full	2.158	.533	0.002	1.330 5.502
Treat 3 Full	.692	.162	0.115	.4381 1.094
Treat 4 Full	.991	.475	0.985	.3870 2.537
Treat 5 Full	2.052	.318	0.000	1.514 1.597
Treat 6 Full	.897	.264	0.713	.5043 1.597
Treat 7 Full	.951	.207	0.817	.6207 1.457

Republican

Comparing Trust in Republicans to Democrats in each Treatment

<u>Model A</u>				
<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treatment 2	.527	.124	0.006**	.0060 .8357
Treatment 3	1.590	.378	0.051**	.9983 2.532
Treatment 4	1.020	.424	0.962	.4521 2.302
Treatment 5	.564	.098	0.001	.4010 .7945
Treatment 6	1.086	.370	0.808	.5573 2.118
Treatment 7	1.026	.241	0.913	.6479 1.624

Comparing Trust in Republicans to Democrats in each Treatment

<u>Model B</u>				
<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>
Treat 2 Full	.442	.090	0.000***	.2969 .6584
Treat 3 Full	1.349	.291	0.165	.8842 2.059
Treat 4 Full	.938	.448	0.894	.3694 2.390
Treat 5 Full	.462	.077	0.000	.3332 .6416
Treat 6 Full	1.016	.335	0.962	.5326 1.937
Treat 7 Full	.911	.206	0.680	.5849 1.419

Comparing Trust in Republicans to Democrats in each Treatment

Model C

<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full					
Treat 3 Full	.452	.109	0.001***	.2822	.7242
	1.413	.292	0.095	.9421	2.120
Treat 4 Full	1.049	.507	0.921	.4068	2.705
Treat 5 Full	.495	.071	0.000	.3739	.6554
Treat 6 Full	1.104	.335	0.744	.6096	2.000
Treat 7 Full	1.030	.253	0.904	.6362	1.668

Comparing Trust in Republicans to Democrats in each Treatment

Model D

<u>LC- Conservatives</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	.463	.114	0.002	.2856	.7521
Treat 3 Full	1.445	.337	0.115	.9144	2.283
Treat 4 Full	1.009	.484	0.985	.3941	2.584
Treat 5 Full	.487	.076	0.000	.3596	.6604
Treat 6 Full	1.114	.328	0.713	.6261	1.983
Treat 7 Full	1.052	.229	0.817	.6865	1.611

Other Political Party

Between Subject Effects. Other Compared to Democrats

Model A

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treatment 2	.910	.290	0.768	.4877	1.699
Treatment 3	1.511	.174	0.000	1.206	1.894
Treatment 4	.867	.133	0.353	.6426	1.171
Treatment 5	.586	.169	0.064	.3324	1.031
Treatment 6	1.306	.762	0.647	.4160	4.101
Treatment 7	1.359	.164	0.011	1.073	1.722

Between Subject Effects. Other Compared to Democrats

Model B

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	.849	.266	0.600	.4596	1.567
Treat 3 Full	1.571	.153	0.000	1.298	1.902
Treat 4 Full	.864	.172	0.461	.5849	1.275
Treat 5 Full	.550	.129	0.011	.3473	.8723
Treat 6 Full	1.352	.823	0.621	.4095	4.461
Treat 7 Full	1.224	.174	0.155	.9266	1.617

Between Subject Effects. Other Compared to Democrats

Model C

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	.856	.287	0.642	.4434	1.652
Treat 3 Full	1.571	.091	0.000	1.402	1.760
Treat 4 Full	.854	.183	0.460	.5607	1.299
Treat 5 Full	.548	.118	0.005	.3593	.8363
Treat 6 Full	1.501	.932	0.514	.4441	5.071
Treat 7 Full	1.202	.107	0.039	1.009	1.432

Between Subject Effects. Other Compared to Democrats

Model D

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	.858	.290	0.650	.4426	1.663
Treat 3 Full	1.590	.074	0.000	1.452	1.741
Treat 4 Full	.879	.182	0.534	.5864	1.319
Treat 5 Full	.550	.125	0.009	.3527	.8591
Treat 6 Full	1.459	.886	0.534	.4437	4.798
Treat 7 Full	1.213	.166	0.159	.9271	1.587

Within Subject

Other Political Party:

Comparing Trust in Other Political Party to Other Political Party in Control Treatment

Model A

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	2.894	.365	0.000	.4288	3.611
Treat 3 Full	1.410	.395	0.220	.8142	2.442
Treatment 4	1.120	.593	0.831	.3968	3.160
Treatment 5	1.625	.695	0.257	.7025	3.757
Treatment 6	2.431	2.364	0.361	.3616	16.345
Treatment 7	1.058	.710	0.934	.2836	3.944

Comparing Trust in Other Political Party to Other Political Party in Control Treatment

Model B

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	2.760	.250	0.000	2.295	3.295
Treat 3 Full	1.423	.403	0.213	.8169	2.477
Treat 4 Full	1.203	.601	0.712	.4519	3.202
Treat 5 Full	1.726	.733	0.198	.7513	3.966
Treat 6 Full	2.675	2.638	0.318	.3872	18.479
Treat 7 Full	1.069	.664	0.915	.3165	3.610

Comparing Trust in Other Political Party to Other Political Party in Control Treatment

Model C

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	2.839	.334	0.000	2.253	3.576
Treat 3 Full	1.435	.369	0.159	.8677	2.375
Treat 4 Full	1.266	.584	0.609	.5124	3.128
Treat 5 Full	1.822	.748	0.144	.8145	4.074
Treat 6 Full	3.012	2.768	0.230	.4975	18.237
Treat 7 Full	1.121	.594	0.829	.3968	3.167

Comparing Trust in Other Political Party to Other Political Party in Control Treatment

Model D

<u>LC- Neutral</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full	2.836	.298	0.000	2.308	3.485
Treat 3 Full	1.400	.363	0.195	.8419	2.328
Treat 4 Full	1.499	.394	0.123	.8961	2.509
Treat 5 Full	2.107	.823	0.056	.9805	4.529
Treat 6 Full	3.475	2.595	0.095	.8045	15.013
Treat 7 Full	1.289	.462	0.479	.6383	2.601

Republican Within Subject

Comparing Trust in Republicans in each Treatment to Republicans in Control Treatment

Model A

<u>LC- Conservative</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treatment 2					
Treatment 3	.878	.048	0.016	.7891	.9760
	.776	.207	0.342	.4609	1.308
Treatment 4	.689	.520	0.622	.1573	3.021
Treatment 5	.820	.545	0.765	.2226	3.019
Treatment 6	1.059	.329	0.854	.5758	1.946
Treatment 7	.418	.141	0.010	.2155	.8101

Comparing Trust in Republicans in each Treatment to Republicans in Control Treatment

Model B

<u>LC- Conservative</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full					
Treat 3 Full	.906	.043	0.035	.8259	.9931
	.770	.181	0.266	.4851	1.2208
Treat 4 Full	.823	.650	0.805	.1750	3.872
Treat 5 Full	.913	.579	0.886	.2634	3.167
Treat 6 Full	1.266	.472	0.527	.6093	2.631
Treat 7 Full	.501	.184	0.060	.2442	1.028

Comparing Trust in Republicans in each Treatment to Republicans in Control Treatment

Model C

<u>LC- Conservative</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full					
Treat 3 Full	.862	.023	0.000	.8176	.9086
	.742	.202	0.274	.4348	1.266
Treat 4 Full	.894	.696	0.886	.1944	4.113
Treat 5 Full	.946	.591	0.929	.2779	3.218
Treat 6 Full	1.274	.439	0.483	.6483	2.503
Treat 7 Full	.552	.174	0.060	.2975	1.026

Comparing Trust in Republicans in each Treatment to Republicans in Control Treatment

Model D

<u>LC- Conservative</u>	<u>Odds Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Treat 2 Full					
Treat 3 Full	.894	.020	0.000	.8556	.9344
	.743	.209	0.292	.4269	1.292
Treat 4 Full	1.004	.550	0.994	.3436	2.935
Treat 5 Full	1.089	.486	0.848	.4544	2.610
Treat 6 Full	1.549	.215	0.002	1.181	2.032
Treat 7 Full	.652	.102	0.006	.4794	.8872

Within Subject Effect: Comparing All Treatment Effects

Democrats

Model A

<u>Democrat</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	3.408	.336	0.000	2.809	4.134
T2-T4	2.462	.630	0.000	1.492	4.065
T2-T5	1.146	.406	0.702	.571	2.297
T2-T6	1.708	.281	0.001	1.237	2.358
T2-T7	4.086	1.322	0.000	2.167	7.702
T3-T2	.293	.029	0.000	.242	.356
T3-T4	.723	.127	0.065	.512	1.020
T3-T5	.336	.095	0.000	.193	.585
T3-T6	.501	.035	0.000	.436	.575
T3-T7	1.199	.287	0.448	.751	1.915
T4-T2	.406	.104	0.000	.246	.670
T4-T3	1.384	.244	0.065	.980	1.954
T4-T5	.465	.050	0.000	.377	.575
T4-T6	.694	.077	0.000	.558	.862
T4-T7	1.659	.115	0.000	1.449	1.900
T5-T2	.873	.310	0.702	.435	1.750
T5-T3	2.974	.840	0.000	1.710	5.174
T5-T4	2.149	.232	0.000	1.740	2.655
T5-T6	1.491	.326	0.068	.971	2.289
T5-T7	3.566	.254	0.000	3.102	4.100
T6-T2	.586	.096	0.001	.424	.809
T6-T3	1.995	.141	0.000	1.738	2.291
T6-T4	1.442	.160	0.000	1.160	1.792
T6-T5	.671	.147	0.068	.437	1.030

T6-T7	2.392	.406	0.000	1.715	3.338
T7-T2	.245	.079	0.000	.130	.461
T7-T3	.834	.199	0.448	.522	1.332
T7-T4	.603	.042	0.000	.526	.690
T7-T5	.280	.020	0.000	.244	.322
T7-T6	.418	.071	0.000	.300	.583

Model B

<u>Democrat</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	3.592	.366	0.000	2.942	4.385
T2-T4	2.335	.590	0.001	1.423	3.831
T2-T5	1.037	.372	0.920	.5133	2.094
T2-T6	1.643	.324	0.012	1.117	2.418
T2-T7	3.724	1.295	0.000	1.883	7.363
T3-T2	.278	.028	0.000	.2281	.3399
T3-T4	.650	.113	0.013	.4623	.9142
T3-T5	.289	.082	0.000	.1654	.5039
T3-T6	.458	.047	0.000	.3737	.5601
T3-T7	1.037	.268	0.889	.6249	1.720
T4-T2	.428	.108	0.001	.2610	.7028
T4-T3	1.538	.268	0.013	1.094	2.163
T4-T5	.444	.049	0.000	.3577	.5513
T4-T6	.7038	.057	0.000	.6005	.8249
T4-T7	1.595	.163	0.000	1.305	1.948
T5-T2	.964	.346	0.920	.4775	1.948
T5-T3	3.464	.985	0.000	1.984	6.047
T5-T4	2.252	.248	0.000	1.814	2.795
T5-T6	1.584	.299	0.015	1.095	2.292
T5-T7	3.591	.290	0.000	3.065	4.208

T6-T2	.609	.120	0.012	.4136	.8954
T6-T3	2.186	.226	0.000	1.785	2.676
T6-T4	1.421	.115	0.000	1.212	1.665
T6-T5	.631	.119	0.015	.4362	.9128
T6-T7	2.266	.352	0.000	1.672	3.071
T7-T2	.269	.093	0.000	.1358	.5310
T7-T3	.965	.249	0.889	.5813	1.600
T7-T4	.627	.064	0.000	.5132	.7661
T7-T5	.278	.023	0.000	.2376	.3263
T7-T6	.441	.068	0.000	.3256	.5981

Model C

<u>Democrat</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	3.631	.265	0.000	3.147	4.189
T2-T4	2.236	.428	0.000	1.537	3.254
T2-T5	.998	.324	0.995	.5281	1.886
T2-T6	1.653	.231	0.000	1.257	2.173
T2-T7	3.556	1.081	0.000	1.960	6.451
T3-T2	.275	.020	0.000	.2387	.3178
T3-T4	.616	.076	0.000	.4835	.7847
T3-T5	.275	.071	0.000	.1655	.4567
T3-T6	.455	.031	0.000	.3988	.5196
T3-T7	.979	.228	0.929	.6204	1.546
T4-T2	.447	.086	0.000	.3073	.6507
T4-T3	1.623	.201	0.000	1.274	2.068
T4-T5	.446	.060	0.000	.3422	.5821
T4-T6	.739	.061	0.000	.6280	.8696
T4-T7	1.590	.183	0.000	1.270	1.991

T5-T2	1.001	.325	0.995	.5302	1.893
T5-T3	3.638	.942	0.000	2.190	6.042
T5-T4	2.241	.304	0.000	1.718	2.922
T5-T6	1.656	.352	0.018	1.091	2.512
T5-T7	3.563	.225	0.000	3.148	4.032
T6-T2	.605	.085	0.000	.4602	.7956
T6-T3	2.197	.148	0.000	1.925	2.508
T6-T4	1.353	.112	0.000	1.150	1.592
T6-T5	.604	.128	0.018	.3981	.9163
T6-T7	2.152	.379	0.000	1.524	3.038
T7-T2	.281	.085	0.000	.1550	.5102
T7-T3	1.021	.238	0.929	.6467	1.612
T7-T4	.629	.072	0.000	.5022	.7875
T7-T5	.281	.018	0.000	.2480	.3178
T7-T6	.465	.082	0.000	.3292	.6560

Model D

<u>Democrat</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	3.754	.276	0.000	3.250	4.335
T2-T4	1.939	.203	0.000	1.578	2.382
T2-T5	.863	.098	0.195	.6914	1.078
T2-T6	1.388	.205	0.027	1.038	1.855
T2-T7	3.111	.354	0.000	2.489	3.888
T3-T2	.266	.020	0.000	.2307	.3077
T3-T4	.517	.078	0.000	.3834	.6957
T3-T5	.230	.017	0.000	.1988	.2661
T3-T6	.370	.073	0.000	.2505	.5457
T3-T7	.829	.077	0.043	.6912	.9939

T4-T2	.516	.054	0.000	.4199	.6335
T4-T3	1.936	.294	0.000	1.437	2.608
T4-T5	.445	.060	0.000	.3427	.5787
T4-T6	.716	.033	0.000	.6532	.7844
T4-T7	1.605	.180	0.000	1.289	1.998
T5-T2	1.158	.131	0.195	.9275	1.446
T5-T3	4.348	.323	0.000	3.758	5.030
T5-T4	2.246	.300	0.000	1.728	2.918
T5-T6	1.607	.283	0.007	1.138	2.271
T5-T7	3.603	.100	0.000	3.412	3.805
T6-T2	.721	.107	0.027	.5392	.9630
T6-T3	2.705	.537	0.000	1.833	3.992
T6-T4	1.397	.065	0.000	1.275	1.531
T6-T5	.622	.110	0.007	.4403	.8790
T6-T7	2.242	.341	0.000	1.664	3.021
T7-T2	.321	.037	0.000	.2572	.4017
T7-T3	1.207	.112	0.043	1.006	1.447
T7-T4	.623	.070	0.000	.5005	.7760
T7-T5	.278	.008	0.000	.2628	.2931
T7-T6	.446	.068	0.000	.3310	.6011

Republican

Model A

<u>Republican</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>
T2-T3	1.130	.260	0.608	.708 1.803
T2-T4	1.273	1.018	0.763	.265 6.107
T2-T5	1.070	.756	0.923	.268 4.276
T2-T6	.829	.301	0.606	.407 1.690
T2-T7	2.100	.802	0.052	.994 4.438
T3-T2	.885	.211	0.608	.554 1.412
T3-T4	1.126	.916	0.884	.229 5.542
T3-T5	.947	.654	0.937	.245 3.667
T3-T6	.733	.350	0.516	.288 1.868
T3-T7	1.858	.780	0.140	.816 4.232
T4-T2	.786	.629	0.763	.164 3.769
T4-T3	.888	.722	0.884	.180 4.369
T4-T5	.841	.120	0.223	.636 1.111
T4-T6	.651	.305	0.360	.260 1.633
T4-T7	1.650	.692	0.232	.725 3.752
T5-T2	.934	.660	0.923	.234 3.732
T5-T3	1.056	.729	0.937	.273 4.088
T5-T4	1.189	.169	0.223	.900 1.571
T5-T6	.774	.321	0.537	.344 1.743
T5-T7	1.962	.644	0.040	1.031 3.734
T6-T2	1.206	.438	0.606	.592 2.459
T6-T3	1.363	.650	0.516	.535 3.472
T6-T4	1.536	.720	0.360	.613 3.850
T6-T5	1.291	.535	0.537	.574 2.907
T6-T7	2.534	.349	0.000	1.934 3.319

T7-T2	.476	.182	0.052	.225	1.006
T7-T3	.538	.226	0.140	.236	1.226
T7-T4	.606	.254	0.232	.266	1.378
T7-T5	.510	.167	0.040	.268	.970
T7-T6	.395	.054	0.000	.301	.517

Model B

<u>Republican</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	1.177	.262	0.464	.7607	1.821
T2-T4	1.100	.920	0.909	.2138	5.662
T2-T5	.992	.672	0.990	.2629	3.740
T2-T6	.715	.301	0.425	.3140	1.630
T2-T7	1.807	.743	0.150	.8076	4.044
T3-T2	.850	.189	0.464	.5492	1.315
T3-T4	.935	.798	0.937	.1753	4.985
T3-T5	.843	.558	0.796	.2302	3.083
T3-T6	.608	.308	0.326	.2250	1.642
T3-T7	1.536	.669	0.325	.6536	3.608
T4-T2	.909	.760	0.909	.1766	4.676
T4-T3	1.070	.913	0.937	.2006	5.703
T4-T5	.901	.190	0.621	.5967	1.361
T4-T6	.650	.282	0.322	.2771	1.525
T4-T7	1.642	.705	0.248	.7080	3.810
T5-T2	1.008	.683	0.990	.2674	3.803
T5-T3	1.187	.786	0.796	.3243	4.343

T5-T4	1.110	.233	0.621	.7347	1.676
T5-T6	.721	.241	0.328	.3751	1.387
T5-T7	1.822	.491	0.026	1.074	3.091
T6-T2	1.398	.587	0.425	.6135	3.185
T6-T3	1.645	.834	0.326	.6090	4.445
T6-T4	1.538	.669	0.322	.6557	3.608
T6-T5	1.386	.463	0.328	.7208	2.666
T6-T7	2.526	.338	0.000	1.943	3.284
T7-T2	.553	.227	0.150	.2473	1.238
T7-T3	.651	.283	0.325	.2772	1.530
T7-T4	.609	.261	0.248	.2625	1.412
T7-T5	.549	.148	0.026	.3235	.9307
T7-T6	.396	.053	0.000	.3045	.5146

Model C

<u>Republican</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	1.162	.319	0.586	.6872	1.989
T2-T4	.964	.776	0.964	.1988	4.673
T2-T5	.912	.593	0.887	.2546	3.263
T2-T6	.677	.251	0.293	.3267	1.401
T2-T7	1.561	.534	0.194	.7979	3.052
T3-T2	.861	.236	0.586	.5026	1.475
T3-T4	.830	.667	0.816	.1717	4.010
T3-T5	.785	.471	0.686	.2423	2.542
T3-T6	.583	.265	0.234	.2391	1.419
T3-T7	1.344	.499	0.427	.6484	2.784
T4-T2	1.038	.836	0.964	.2140	5.030
T4-T3	1.205	.969	0.816	.2494	5.824

T4-T5	.946	.211	0.803	.6105	1.465
T4-T6	.702	.310	0.422	.2958	1.666
T4-T7	1.619	.756	0.302	.6481	4.045
T5-T2	1.097	.714	0.887	.3065	3.927
T5-T3	1.274	.764	0.686	.3934	4.127
T5-T4	1.057	.236	0.803	.6826	1.638
T5-T6	.742	.246	0.369	.3874	1.422
T5-T7	1.712	.535	0.085	.9279	3.159
T6-T2	1.478	.549	0.293	.7136	3.061
T6-T3	1.717	.780	0.234	.7045	4.183
T6-T4	1.425	.628	0.422	.6003	3.381
T6-T5	1.347	.447	0.369	.7032	2.581
T6-T7	2.306	.223	0.000	1.908	2.788
T7-T2	.641	.219	0.194	.3276	1.253
T7-T3	.744	.277	0.427	.3592	1.542
T7-T4	.618	.289	0.302	.2472	1.543
T7-T5	.584	.183	0.085	.3166	1.078
T7-T6	.434	.042	0.000	.3586	.5242

Model D

<u>Republican</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>
T2-T3	1.204	.321	0.485	.7145 2.029
T2-T4	.890	.498	0.835	.2976 2.663
T2-T5	.821	.369	0.661	.3399 1.983
T2-T6	.577	.088	0.000	.4287 .7770
T2-T7	1.371	.219	0.048	1.002 1.875
T3-T2	.831	.221	0.485	.4928 1.400
T3-T4	.739	.416	0.592	.2455 2.227
T3-T5	.682	.255	0.305	.3281 1.417
T3-T6	.479	.140	0.012	.2706 .8491
T3-T7	1.139	.250	0.555	.7401 1.752
T4-T2	1.123	.628	0.835	.3755 3.360
T4-T3	1.352	.761	0.592	.4490 4.074
T4-T5	.922	.196	0.704	.6074 1.400
T4-T6	.648	.265	0.289	.2909 1.444
T4-T7	1.540	.638	0.298	.6834 3.470
T5-T2	1.218	.548	0.661	.5042 2.942
T5-T3	1.467	.547	0.305	.7056 6.825
T5-T4	1.084	.231	0.704	.7142 1.646
T5-T6	.703	.227	0.276	.3739 1.325
T5-T7	1.670	.485	0.077	.9455 2.949
T6-T2	1.733	.263	0.000	1.287 2.332
T6-T3	2.086	.608	0.012	1.178 3.695
T6-T4	1.543	.631	0.289	.6923 3.437
T6-T5	1.423	.460	0.276	.7546 2.682
T6-T7	2.375	.181	0.000	2.046 2.758
T7-T2	.729	.117	0.048	.5333 .9977
T7-T3	.878	.193	0.555	.5709 1.351

T7-T4	.649	.269	0.298	.2882	1.463
T7-T5	.599	.174	0.077	.3391	1.058
T7-T6	.421	.032	0.000	.3626	.4888

Others

Model A

<u>Other</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	2.052	.665	0.027	1.087	3.874
T2-T4	2.584	1.391	0.078	.900	7.419
T2-T5	1.781	.911	0.259	.653	4.855
T2-T6	1.190	1.189	0.862	.168	8.434
T2-T7	2.736	1.979	0.164	.663	11.295
T3-T2	.487	.16	0.027	.258	.920
T3-T4	1.259	.328	0.377	.755	2.099
T3-T5	.868	.190	0.517	.565	1.333
T3-T6	.580	.401	0.431	.149	2.51
T3-T7	1.333	.533	0.472	.609	2.919
T4-T2	.387	.208	0.078	.135	1.111
T4-T3	.794	.207	0.377	.476	1.324
T4-T5	.689	.227	0.258	.361	1.314
T4-T6	.461	.214	0.096	.185	1.147
T4-T7	1.059	.287	0.833	.623	1.780
T5-T2	.561	.287	0.259	.206	1.530
T5-T3	1.152	.425	0.650	.750	1.768
T5-T4	1.451	.478	0.258	.761	2.767
T5-T6	.668	.416	0.517	.197	2.262
T5-T7	1.536	.440	0.134	.876	2.694
T6-T2	.840	.839	0.862	.119	5.954

T6-T3	1.724	1.193	0.431	.444	6.694
T6-T4	2.171	1.011	0.096	.872	5.406
T6-T5	1.496	.931	0.517	.442	5.066
T6-T7	2.299	.775	0.014	1.187	4.452
T7-T2	.366	.264	0.164	.089	1.509
T7-T3	.750	.300	0.472	.343	1.642
T7-T4	.944	.256	0.833	.556	1.605
T7-T5	.651	.187	0.134	.371	1.142
T7-T6	.435	.147	0.014	.225	.842

Model B

<u>Other</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	1.940	.694	0.064	.9618	3.913
T2-T4	2.294	1.250	0.127	.7888	6.674
T2-T5	1.599	.813	0.356	.5901	4.332
T2-T6	1.032	1.080	0.976	.1327	8.023
T2-T7	2.582	1.757	0.163	.6804	9.798
T3-T2	.515	.185	0.064	.2556	1.040
T3-T4	1.183	.323	0.539	.6930	2.019
T3-T5	.824	.139	0.252	.5921	1.147
T3-T6	.532	.378	0.374	.1321	2.141
T3-T7	1.331	.467	0.416	.6687	2.649
T4-T2	.436	.237	0.127	.1498	1.268
T4-T3	.846	.231	0.539	.4953	1.443
T4-T5	.697	.230	0.273	.3653	1.329
T4-T6	.450	.233	0.122	.1632	1.239
T4-T7	1.125	.193	0.490	.8046	1.574
T5-T2	.625	.318	0.356	.2308	1.695

T5-T3	1.213	.205	0.252	.8718	1.689
T5-T4	1.435	.473	0.273	.7524	2.737
T5-T6	.645	.410	0.490	.1860	2.239
T5-T7	1.615	.515	0.133	.8642	3.018
T6-T2	.969	1.014	0.976	.1246	7.537
T6-T3	1.880	1.336	0.374	.4671	7.569
T6-T4	2.224	1.150	0.122	.8070	6.128
T6-T5	1.550	.984	0.490	.4466	5.377
T6-T7	2.503	.916	0.012	1.221	5.129
T7-T2	.387	.264	0.163	.1021	1.470
T7-T3	.751	.264	0.416	.3775	1.495
T7-T4	.889	.152	0.490	.6354	1.243
T7-T5	.619	.198	0.133	.3314	1.157
T7-T6	.400	.146	0.012	.1950	.8189

Model C

<u>Other</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>	
T2-T3	1.978	.730	0.065	.9587	4.079
T2-T4	2.242	1.217	0.137	.7739	6.495
T2-T5	1.558	.822	0.401	.5541	4.382
T2-T6	.942	.957	0.953	.1289	6.893
T2-T7	2.532	1.594	0.140	.7374	8.693
T3-T2	.506	.187	0.065	.2452	1.043
T3-T4	1.134	.311	0.647	.6620	1.942
T3-T5	.788	.133	0.159	.5655	1.098
T3-T6	.477	.322	0.273	.1266	1.794
T3-T7	1.280	.371	0.393	.7260	2.2580
T4-T2	.446	.242	0.137	.1540	1.292

T4-T3	.882	.242	0.647	.5150	1.512
T4-T5	.695	.226	0.263	.3676	1.314
T4-T6	.420	.204	0.074	.1623	1.088
T4-T7	1.129	.172	0.426	.8373	1.523
T5-T2	.642	.339	0.401	.2282	1.805
T5-T3	1.269	.215	0.159	.9109	1.768
T5-T4	1.439	.468	0.263	.7610	2.721
T5-T6	.605	.359	0.397	.1890	1.936
T5-T7	1.625	.408	0.053	.9932	2.658
T6-T2	1.061	1.077	0.953	.1451	7.761
T6-T3	2.098	1.419	0.273	.5573	7.901
T6-T4	2.379	1.154	0.074	.9188	6.160
T6-T5	1.653	.981	0.397	.5166	5.292
T6-T7	2.687	1.046	0.011	1.253	5.763
T7-T2	.395	.249	0.140	.1150	1.356
T7-T3	.781	.226	0.393	.4429	1.377
T7-T4	.885	.135	0.426	.6565	1.194
T7-T5	.6154	.155	0.053	.3762	1.007
T7-T6	.372	.145	0.011	.1735	.7984

Model D

<u>Other</u>	<u>Odd Ratio</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf Interval</u>
T2-T3	2.026	.735	0.051	.9955 4.123
T2-T4	1.892	.688	0.080	.9268 3.860
T2-T5	1.346	.642	0.534	.5281 3.430
T2-T6	.816	.691	0.810	.1552 4.291
T2-T7	2.201	1.014	0.087	.8921 5.430
T3-T2	.494	.179	0.051	.2425 1.004

T3-T4	.934	.021	0.002	.8941	.9759
T3-T5	.664	.203	0.181	.3648	1.209
T3-T6	.403	.197	0.063	.1545	1.050
T3-T7	1.086	.108	0.404	.8942	1.320
T4-T2	.529	.192	0.080	.2590	1.078
T4-T3	1.072	.024	0.002	1.026	1.118
T4-T5	.711	.233	0.299	.3742	1.353
T4-T6	.431	.209	0.082	.1671	1.114
T4-T7	1.164	.113	0.120	.9615	1.408
T5-T2	.743	.355	0.534	.2916	1.894
T5-T3	1.505	.460	0.181	.8268	2.741
T5-T4	1.405	.461	0.299	.7393	2.672
T5-T6	.606	.379	0.423	.1784	2.061
T5-T7	1.635	.549	0.143	.8472	3.157
T6-T2	1.225	1.038	0.810	.2330	6.443
T6-T3	2.483	1.213	0.063	.9526	6.471
T6-T4	2.318	1.122	0.082	.8978	5.985
T6-T5	1.649	1.030	0.423	.4851	5.607
T6-T7	2.697	1.051	0.011	1.257	5.787
T7-T2	.454	.209	0.087	.1842	1.121
T7-T3	.921	.091	0.404	.7577	1.118
T7-T4	.859	.084	0.120	.7102	1.040
T7-T5	.611	.205	0.143	.3168	1.180
T7-T6	.371	.144	0.011	.1728	.7956

Margin Effects

Margins are generated using the `atmeans`, using the `vce(unconditional)` command. `vce(unconditional)` specifies that the covariates that are not fixed be treated in a way that accounts for their having been sampled. The VCE is estimated using the linearization method. This method allows for heteroskedasticity or other violations of distributional assumptions and allows for correlation among the observations in the same manner as `vce(robust)` and `vce(cluster)`, which may have been specified with the estimation command.

<u>Model D</u>	
<u>Expression Pr(Trust), predict</u>	
<u>(at)</u>	<u>Mean</u>
T1	.170
T2	.177
T3	.171
T4	.141
T5	.143
T6	.139
T7	.057
PolParty Dem	.541
PolParty Rep	.237
PolParty Other	.222
Heterosexual	.888
Homosexual	.041
Bisexual	.072
Sex Male	.460
Sex Female	.540
Educate Basic	.125
Educate Moderate	.677
Educate Advanced	.198
Income	3.471
Age	34.279
Service Non Attendance	.605
Service Attendance	.395
Ethnic White	.744
Ethnic Non White	.256
Mturk	.381
Find Participants	.299
Social Science	.320
Extraversion	7.421
Agreeableness	10.265
Emotional Stability	9.522
Openness	10.163
Conscientiousness	10.474
Time of Study	6.549

Marginal Effects Tables. PolParty:

<u>Model D</u> <u>PolParty</u>	<u>Prob</u>	<u>Std. Err.</u>	<u>Conf Int</u>	
T1	.644	.056	.5341997	.754278
T2	.791	.020	.7509441	.8314309
T3	.602	.010	.5831477	.6218372
T4	.702	.016	.6710501	.7343159
T5	.801	.021	.7603724	.8415925
T6	.791	.016	.759764	.8220145
T7	.614	.017	.5810906	.6488623
PolParty Dem	.723	.008	.7068139	.7392101
PolParty Rep	.710	.024	.6639173	.7561699
PolParty Other	.721	.004	.711881	.7292903
T1 Dem	.634	.055	.5265958	.7420783
T1 Rep	.714	.061	.5957232	.8331567
T1 Other	.587	.051	.4875025	.6870916
T2 Dem	.823	.004	.8147845	.831357
T2 Rep	.691	.063	.566942	.8152017
T2 Other	.801	.050	.7031573	.899708
T3 Dem	.554	.023	.5077616	.5990945
T3 Rep	.650	.050	.5513509	.7488196
T3 Other	.666	.015	.6363571	.6952174
T4 Dem	.706	.025	.6567844	.7548642
T4 Rep	.715	.069	.5791093	.8515042
T4 Other	.681	.018	.6450407	.7167407
T5 Dem	.843	.019	.806729	.8801801
T5 Rep	.732	.033	.6675612	.7954574
T5 Other	.750	.050	.6518831	.8479829
T6 Dem	.770	.028	.7150055	.8254516
T6 Rep	.795	.033	.7310865	.8587174
T6 Other	.832	.076	.6814227	.9822032
T7 Dem	.599	.034	.5320386	.6664398
T7 Rep	.620	.033	.5546185	.6854149
T7 Other	.647	.037	.5752301	.7190044

<u>Continuous dy/dx</u> <u>Variable</u>	<u>Probability</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Age	-.0015	.0012	.241	-.003883	.0009778
Income	.009	.007	.179	-.004104	.0220702
Openness	.010	.003	.006	.0027004	.0164023
Conscientiousness	-.014	.005	.010	-.02421	-.003364
Agreeableness	-.000	.003	.928	-.0052304	.0047687
Extraversion	.006	.003	.085	-.0008137	.012522
Emotional S	.003	.002	.036	.00219	.006411
Time of Study	-.013	.003	.000	-.0193475	-.0065266

<u>Continuous Variable</u>	<u>Probability</u>	<u>Std. Err.</u>	<u>P> z </u>	<u>95% Conf. Interval</u>	
Age 18 (min)	.725	.023	0.000	.6801756	.7693194
Age 34 (mean)	.702	.041	0.000	.6217917	.7821911
Age 82 (max)	.628	.105	0.000	.4226839	.8338895
Income 1 (min)	.679	.029	0.000	.6231856	.7361983
Income 3.45 (mean)	.702	.041	0.000	.6211484	.7836116
Income 6 (median)	.725	.056	0.000	.6158895	.8334656
Income 11 (max)	.766	.080	0.000	.6081507	.9234028
Consc 2 (min)	.806	.071	0.000	.6672957	.9441209
Consc 6 (median)	.760	.060	0.000	.6428982	.8777637
Consc 10.47 (mean)	.702	.042	0.000	.6205554	.7838815
Consc 14 (max)	.651	.026	0.000	.6011645	.7017347
Emotion 2 (min)	.676	.047	0.000	.5834212	.7681741
Emotion 6 (median)	.689	.045	0.000	.6021772	.7767547
Emotion 9.5 (mean)	.701	.043	0.000	.6170562	.7854387
Emotion 14 (max)	.716	.042	0.000	.6337889	.7979935
Agree 2 (min)	.703	.017	0.000	.5855553	.6525624
Agree 6 (median)	.702	.028	0.000	.6064295	.7153437
Agree 10.2 (mean)	.701	.042	0.000	.6203385	.7839496
Agree 14 (max)	.701	.053	0.000	.6334565	.8416194
Open 2 (min)	.619	.017	0.000	.5855553	.6525624
Open 6 (median)	.661	.028	0.000	.6064295	.7153437
Open 10.1 (mean)	.702	.042	0.000	.6203385	.7839496
Open 14 (max)	.738	.053	0.000	.6334565	.8416194
Extra 2 (min)	.670	.050	0.000	.5723025	.7667119
Extra 6 (median)	.694	.044	0.000	.608043	.7795539
Extra 7.4 (mean)	.702	.043	0.000	.618562	.7858288
Extra 14 (max)	.739	.044	0.000	.6533639	.8254863
Study 1 (min)	.768	.054	0.000	.6629977	.8732805
Study 6.2 (mean)	.706	.045	0.000	.6167953	.7945859
Study 13 (max)	.612	.031	0.000	.5523389	.6721343

Section 7
Regression by Implicit Attitude Measure

<u>Model</u>	<u>Moral Code</u>	<u>Out-groups</u>	<u>Role of Group</u>	<u>Leadership</u>	<u>Absolutes</u>
Treatment 2	3.744*** (0.271)	17.490*** (11.644)	3.668*** (0.886)	2.236*** (0.142)	2.794*** (0.643)
Treatment 3	.961 (0.354)	1.196 (0.749)	.826 (0.115)	.690 (0.215)	.842 (0.265)
Treatment 4	1.075 (0.466)	1.161 (0.878)	.803 (0.326)	1.019 (0.604)	1.026 (0.599)
Treatment 5	2.069 (1.105)	2.817 (3.451)	2.814** (1.898)	1.925 (1.116)	1.677 (1.060)
Treatment 6	1.689 (0.693)	2.376 (1.888)	1.386 (0.609)	1.498 (0.718)	1.235 (0.490)
Treatment 7	1.484 (0.902)	.763 (0.808)	.690 (0.243)	.770 (0.455)	.937 (0.439)
Control	2.707***	2.158**	1.076	1.082	1.093
Category 2	(0.457)	(0.820)	(0.499)	(0.232)	(0.116)
Control	1.895	1.144	.737	1.778	1.091
Category 3	(0.830)	(0.191)	(0.373)	(0.357)	(0.288)
Control	1.538	1.875*	1.131		
Category 4	(0.851)	(0.694)	(0.115)		
Treat 2 Cat 2	.208 (0.053)	.131 (0.133)	.483 (0.165)	.757 (0.264)	.524 (0.232)
Treat 2 Cat 3	.307 (0.179)	.103 (0.063)	.670 (0.270)	.496 (0.078)	.440 (0.140)
Treat 2 Cat 4	.224 (0.033)	.051 (0.031)	.202 (0.045)		
Treat 3 Cat 2	.494 (0.263)	.534 (0.349)	.968 (0.438)	1.743 (0.496)	1.020 (0.151)
Treat 3 Cat 3	.740 (0.182)	.860 (0.310)	1.308 (0.424)	1.477 (0.552)	1.201 (0.157)
Treat 3 Cat 4	.991 (0.421)	.563 (0.223)	.888 (0.150)		
Treat 4 Cat 2	.622 (0.242)	.635 (0.280)	1.096 (0.626)	1.084 (0.544)	1.045 (0.408)
Treat 4 Cat 3	.791 (0.548)	.948 (0.197)	2.418 (1.498)	.607 (0.198)	.518 (0.292)
Treat 4 Cat 4	.749 (0.228)	.744 (0.422)	.754 (0.172)		
Treat 5 Cat 2	.762 (0.102)	.523 (0.303)	.402 (0.244)	.661 (0.293)	.996 (0.466)
Treat 5 Cat 3	.519 (0.146)	.594 (0.508)	1.097 (0.488)	.495 (0.504)	.694 (0.076)

Treat 5 Cat 4	.368 (0.155)	.439 (0.438)	.238 (0.113)		
Treat 6 Cat 2	.725 (0.460)	.480 (0.288)	.990 (0.458)	1.166 (0.161)	1.752 (0.162)
Treat 6 Cat 3	1.073 (0.519)	.734 (0.439)	2.015 (0.208)	1.051 (0.952)	1.438 (0.303)
Treat 6 Cat 4	.598 (0.363)	.523 (0.277)	.703 (0.307)		
Treat 7 Cat 2	.079 (0.024)	.907 (0.836)	.746 (0.737)	.799 (0.452)	.431 (0.024)
Treat 7 Cat 3	.218 (0.056)	.865 (0.607)	1.515 (0.826)	.284 (0.236)	.528 (0.303)
Treat 7 Cat 4	.283 (0.363)	.752 (0.623)	.643 (0.192)		
Platform Find Part	1.838*** (0.184)	1.754*** (0.177)	1.741*** (0.179)	1.745*** (0.211)	1.852*** (0.214)
Platform Soc Sci	1.852*** (0.218)	1.751*** (0.197)	1.770** (0.188)	1.829*** (0.184)	1.832 (0.147)
Constant1	1.0255 (0.324)	.994 (0.528)	1.476 (0.311)	1.303 (0.413)	1.319 (0.366)

Summary Tables: Lincom Function of Between Subject Effects

<u>Model</u>	<u>Moral Code</u> <u>Odds Ratio</u>	<u>Out-group</u> <u>Odds Ratio</u>	<u>Role of Group</u> <u>Odds Ratio</u>	<u>Leadership</u> <u>Odds Ratio</u>	<u>Absolute</u> <u>Odds Ratio</u>
Treat 2. Cat 2	.562*** (0.090)	.282* (0.183)	.520*** (0.094)	.819 (0.325)	.572 (0.198)
Treat 2. Cat 3	.582** (0.103)	.117*** (0.062)	.494*** (0.051)	.882** (0.039)	.480* (0.212)
Treat 2. Cat 4	.345* (0.191)	.096*** (0.049)			
Treat 3. Cat 2	1.338 (0.628)	1.152 (0.322)	1.042 (0.176)	1.885*** (0.362)	1.115 (0.132)
Treat 3. Cat 3	1.402 (0.711)	.983 (0.210)	.965 (0.213)	2.627*** (0.633)	1.310 (0.404)
Treat 3. Cat 4	1.524 (0.417)	1.056 (0.099)			
Treat 4. Cat 2	1.682** (0.376)	1.371 (0.340)	1.180 (0.174)	1.173 (0.425)	1.142 (0.326)
Treat 4. Cat 3	1.499 (0.399)	1.084 (0.078)	1.783*** (0.318)	1.080 (0.221)	.565* (0.221)
Treat 4. Cat 4	1.153 (0.352)	1.395 (0.471)			
Treat 5. Cat 2	2.063*** (0.187)	1.129 (0.402)	.432** (0.160)	.715 (0.194)	1.089 (0.416)
Treat 5. Cat 3	.984 (0.162)	.679 (0.500)	.809 (0.418)	.880 (0.767)	.757 (0.245)
Treat 5. Cat 4	.567** (0.147)	.823 (0.620)			
Treat 6 Cat 2	1.963 (0.996)	1.036 (0.538)	1.066 (0.084)	1.261 (0.371)	1.915*** (0.357)
Treat 6. Cat 3	2.033 (1.104)	.839 (0.456)	1.486 (0.627)	1.868 (1.327)	1.568 (0.627)
Treat 6. Cat 4	.920 (0.170)	.981 (0.450)			
Treat 7. Cat 2	.215*** (0.087)	1.956 (1.470)	.803 (0.422)	.864 (0.505)	.471*** (0.072)
Treat 7. Cat 3	.414* (0.188)	.989 (0.586)	1.117 (0.170)	.504 (3.19)	.576 (.330)
Treat 7. Cat 4	.436 (0.328)	1.411 (0.769)			

Summary Tables: Lincom Function of Within Subject Effects

<u>Model</u> <u>MoralCode</u>	<u>Moral Code</u> <u>Odds Ratio</u>	<u>Out-group</u> <u>Odds Ratio</u>	<u>Role Group</u> <u>Odds Ratio</u>	<u>Leadership</u> <u>Odds Ratio</u>	<u>Absolute</u> <u>Odds Ratio</u>
Treat 2. Cat 1	3.744*** (0.271)	17.490*** (11.646)	3.668*** (0.886)	2.236*** (0.142)	2.794*** (0.643)
Treat 2. Cat 2	.777 (0.196)	2.289* (0.988)	1.773*** (0.190)	1.693* (0.491)	1.464* (0.312)
Treat 2. Cat 3	1.151 (0.606)	1.796** (0.362)	2.457*** (0.461)	1.109 (0.245)	1.229 (0.317)

Treat 2. Cat 4	.839** (0.062)	.896** (0.050)	.739* (0.115)		
Treat 3. Cat 1	.961 (0.354)	1.196 (0.749)	.826 (0.115)	.690 (2.15)	.842 (0.265)
Treat 3. Cat 2	.475 (0.252)	.638*** (0.084)	.799 (0.361)	1.202*** (0.054)	.859 (0.146)
Treat 3. Cat 3	.711 (0.277)	1.028 (0.278)	1.080 (0.378)	1.019 (0.165)	1.011 (0.224)
Treat 3. Cat 4	.952 (0.415)	.673* (0.158)	.734 (0.184)		
Treat 4. Cat 1	1.075 (0.466)	1.161 (0.878)	.803 (0.326)	1.019 (0.604)	1.026 (0.599)
Treat 4. Cat 2	.668 (0.544)	.738 (0.297)	.881 (0.537)	1.104 (0.546)	1.072 (0.232)
Treat 4. Cat 3	.850 (0.883)	1.100 (0.625)	1.943 (1.285)	.619 (0.317)	.532 (0.610)
Treat 4. Cat 4	.805 (0.235)	.863 (0.521)	.606 (0.372)		
Treat 5. Cat 1	2.069 (1.105)	2.817 (3.451)	2.814 (1.898)	1.925 (1.116)	1.677 (1.060)
Treat 5. Cat 2	1.576 (0.966)	1.475 (1.040)	1.130 (0.749)	1.272* (0.182)	1.670 (0.595)
Treat 5. Cat 3	1.074 (0.852)	1.673 (0.847)	3.086** (1.326)	.952 (1.319)	1.163 (0.708)
Treat 5. Cat 4	.762* (0.120)	1.237 (0.298)	.669 (0.193)		
Treat 6. Cat 1	1.689 (0.693)	2.376 (1.889)	1.386 (0.609)	1.498 (0.718)	1.235 (0.490)
Treat 6. Cat 2	1.225 (1.272)	1.141 (0.357)	1.372 (0.996)	1.747 (0.806)	2.163* (0.980)
Treat 6. Cat 3	1.813 (1.561)	1.744 (0.672)	2.792* (1.491)	1.574 (1.268)	1.775 (0.780)
Treat 6. Cat 4	1.010 (0.309)	1.243 (0.710)	.975 (0.076)		
Treat 7. Cat 1	1.484 (1.051)	.763 (0.808)	.690 (0.244)	.770 (0.455)	.937 (0.439)
Treat 7. Cat 2	.118*** (0.056)	.692 (0.280)	.515 (0.511)	.615 (0.254)	.403* (0.199)
Treat 7. Cat 3	.324 (0.295)	.660 (0.291)	1.045 (0.751)	.219 (0.171)	.495 (0.304)
Treat 7. Cat 4	.420 (0.242)	.574 (0.290)	.443*** (0.029)		

Appendix B:

Experiment 2 Effect of Inequality on Group Cooperation

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Section 1:

Common Support: Wilson Patterson Model

Mean Age by Ideological Orientation Across the Wilson-Patterson Dimension.			
Age WP	Obs.	Mean.	Std.
Age	1245	35.736	11.649
Age WP Liberal	631	35.552	9.390
Age WP Conservative	416	40.858	13.115
Age WP Neutral	198	38.222	11.914

Annual Income Levels by Ideological Orientation Across the Wilson-Patterson Dimension.

Income WP	Liberal	Neutral	Conservative	Total
\$0-\$15,000	135 21.39%	27 13.64%	77 18.51%	239 19.20%
\$15,001-30,000	123 19.49%	47 23.74%	87 20.91%	257 20.64%
\$30,001-\$45,000	138 21.87%	27 13.64%	73 17.55%	238 19.12%
\$45,001-\$60,000	95 15.06%	45 22.73%	71 17.07%	211 16.95%
\$60,001-\$75,000	69 10.94%	19 9.60%	30 7.21%	118 9.48%
\$75,001-\$90,000	27 4.28%	16 8.08%	28 6.73%	71 5.70%
\$90,0001-\$105,000	22 3.49%	6 3.03%	16 3.85%	44 3.53%
\$105,001-\$120,000	7 1.11%	5 2.53%	10 2.40%	22 1.77%
\$120,001-\$135,000	5 0.79%	0 0.00%	13 3.13%	18 1.45%
\$135,001-\$150,000	2 0.32%	2 1.01%	4 0.96%	8 0.64%
\$150,000+	8 1.27%	4 2.02%	7 1.68%	19 1.53%
Total	631 100%	198 100%	416 100%	1245 100%

Ethnicity by Ideological Orientation Across the Wilson-Patterson Dimension.

Ethnic WP	Liberal WP	Neutral WP	Conservative WP	Total
White	492 77.97%	170 85.86%	369 88.70%	1031 82.81%
Hispanic	39 6.18%	7 3.54%	13 3.13%	59 4.74%
Asian	53 8.40%	11 5.56%	18 4.33%	82 6.59%
Black	37 5.86%	8 4.04%	9 2.16%	54 4.34%
Other	10 1.58%	2 1.01%	7 1.68%	19 1.53%
Total	631 100%	198 100%	416 100%	1245 100%

Sex by Ideological Orientation Across the Wilson-Patterson Dimension.

Sex WP	Liberal	Neutral	Conservative	Total
Male	340 53.88%	99 50.00%	192 46.15%	631 50.68%
Female	291 46.12%	99 50.00%	224 53.85%	614 49.32%
Total	631 100%	109 100%	416 100%	1245 100%

Service Attendance by Ideological Orientation Across the Wilson-Patterson Dimension.

Serve WP	Liberal	Neutral	Conservative	Total
No Attendance	523 82.88%	136 68.69%	165 39.66%	824 66.18%
Attendance	108 17.12%	62 31.31%	251 60.34%	421 33.82%
Total	631 100%	198 100%	416 100%	1245 100%

Education by Ideological Orientation Across the Wilson-Patterson Dimension.

Education	Liberal	Neutral	Conservative	Total
Basic	65 10.30%	40 20.20%	72 17.31%	177 14.22%
Intermediate	503 79.71%	137 69.19%	287 68.99%	927 74.46%
Advanced	63 9.98%	21 10.61%	57 13.70%	141 11.33%
Total	631 100%	198 100%	416 100%	1245 100%

Participants in each Treatment by Ideological Orientation Across the Wilson-Patterson Dimension.

Treatment	Liberal	Neutral	Conservative	Total
1.Control	84 47.19%	32 17.98%	62 34.83%	178 100%
2.High	94 50.54%	24 12.90%	68 36.56%	186 100%
3.Low	98 53.26%	27 14.67%	59 32.07%	184 100%
4.Low "Fair"	96 53.33%	34 18.89%	50 27.78%	180 100%
5.Low "Unfair"	78 44.07%	34 19.21%	65 36.72%	177 100%
6.High "Redistribute"	104 56.52%	19 10.33%	61 33.15%	184 100%
7.High "No Redistribute"	77 49.36%	28 17.95%	51 32.69%	156 100%
Total	631 50.68%	198 15.90%	416 33.41%	1245 100%

Common Support: Attitudes towards Inequality Model

Mean Age by Ideological Orientation Across the Inequality Dimension.

Age	Obs.	Mean.	Std.
Age	1245	35.736	11.649
Age WP Inequality Liberal	296	35.254	11.260
Age WP Inequality Neutral	233	35.910	10.755
Age WP Inequality Conservative	716	37.617	12.360

Annual Income Levels by Ideological Orientation Across the Inequality Dimension.

Income	Liberal	Neutral	Conservative	Total
\$0-\$15,000	51 17.23%	41 17.60%	147 20.53%	239 19.20%
\$15,001-30,000	58 19.59%	47 20.17%	152 21.23%	257 20.64%
\$30,001-\$45,000	60 20.27%	58 24.89%	120 16.76%	238 19.12%
\$45,001-\$60,000	53 17.91%	38 16.31%	120 16.76%	211 16.95%
\$60,001-\$75,000	32 10.81%	17 7.30%	69 9.64%	118 9.48%
\$75,001-\$90,000	15 5.07%	15 6.44%	41 5.73%	71 5.70%
\$90,0001-\$105,000	9 3.04%	10 4.29%	25 3.49%	44 3.53%
\$105,001-\$120,000	5 1.69%	2 0.86%	15 2.09%	22 1.77%
\$120,001-\$135,000	6 2.03%	3 1.29%	9 3.85%	18 1.45%
\$135,001-\$150,000	0 0.00%	0 0.00%	3 1.28%	8 0.64%
\$150,000+	7 2.36%	2 0.86%	5 2.14%	19 1.53%
Total	296 100%	233 100%	716 100%	1245 100%

Ethnicity by Ideological Orientation Across the Inequality Dimension.

Ethnicity	Liberals	Neutral	Conservative	Total
White	296 79.73%	190 81.55%	605 84.50%	1031 82.81%
Hispanic	18 6.08%	9 3.86%	32 4.47%	59 4.74%
Asian	26 8.78%	19 8.15%	37 5.17%	82 6.59%
Black	12 4.05%	9 3.86%	33 4.61%	54 4.34%
Other	4 1.35%	6 2.58%	19 1.26%	19 1.53%
Total	296 100%	233 100%	716 100%	1245 100%

Sex by Ideological Orientation Across the Inequality Dimension.

Sex	Liberal	Neutral	Conservative	Total
Male	154 52.03%	99 42.49%	378 52.79%	631 50.68%
Female	142 47.97%	134 57.51%	388 47.21%	614 49.32%
Total	296 100%	117 100%	716 100%	1245 100%

Service Attendance by Ideological Orientation Across the Inequality Dimension.

Service	Liberal	Neutral	Conservative	Total
No Attendance	202 68.24%	167 71.67%	455 63.55%	824 66.18%
Attendance	94 31.76%	66 28.33%	261 36.45%	421 33.82%
Total	296	117	716	1245

Education by Ideological Orientation Across the Inequality Dimension.

Education	Liberal	Neutral	Conservative	Total
Basic	31 10.47%	33 14.16%	113 15.78%	177 14.22%
Intermediate	228 77.03%	177 75.97%	522 72.91%	927 74.46%
Advanced	37 12.50%	123 9.87%	81 11.31%	141 11.33%
Total	547 100%	233 100%	716 100%	1245 100%

Participants in each Treatment by Ideological Orientation Across the Inequality Dimension.

Treatment	Liberal	Neutral	Conservative	Total
1.Control	50 28.09%	39 21.91%	89 50.00%	178 100%
2.High	32 17.20%	31 16.67%	123 66.13%	186 100%
3.Low	43 23.37%	41 22.28%	100 54.35%	184 100%
4.Low "Fair"	43 23.89%	40 22.22%	97 53.89%	180 100%
5.Low "Unfair"	40 22.60%	27 15.25%	110 62.15%	177 100%
6.High "Redistribute"	53 28.80%	30 16.30%	101 54.89%	184 100%
7.High "No Redistribute"	35 22.44%	25 16.03%	96 61.54%	156 100%
Total	296 23.78%	233 18.71%	716 57.51%	1245 100%

Section 2: Regression Models:

Correlations and Model Tests:

Table 1: Linear Regression of a Continuous Measure of Self-Report Liberal-Conservative Ideological on a 20-point Wilson Patterson Index. Ideological Orientation is Measured on a 7-point Likert Scale.

Ideology	Coef..	Std.	P> z	Conf Int.
Liberal- Conservative	.182	.004	0.000	0.174 0.191
cons	4.387	.036	0.000	4.316 4.457

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 2: Leven's Robustness Test Comparing the Variance in Cooperation Between Liberals, Neutrals, and Conservatives Based on the Wilson Patterson Index

WorksCat	Mean	Std.	Freq.
Liberal	9.490	7.088	631
Conservative	8.320	6.767	198
Neutrals	8.652	7.456	198
Totals	8.965	7.058	1245
W0	2.611	df (1, 1242)	Pr > F= 0.074
W50	2.284	df (1,1242)	Pr > F= 0.102
W10	2.611	df(1, 1242)	Pr > F= 0.074

P > 0.05* Denotes Significance

Table 3: Breusch-Pagan Test of Heteroskedasticity.
Full Wilson Patterson Model.

Variables	Treatment*Attitudes
Chi2 (20)	16.34
Prob > Chi2	0.6952

P > 0.05* Denotes Significance

Overall Levels of Cooperation:

Table 4:

Number of obs	1,245
F(6,1238)	13.52
Prob > F	0.0000
R-square	0.0589
Root MSE	6.8641

Table 4: Linear Regression of the Effect of Treatment on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.034	.706	0.961	-1.420 1.351
Treatment 3	-1.056	.741	0.154	-2.509 .397
Treatment 4	1.211	.758	0.111	-.277 2.699
Treatment 5	-2.607	.739	0.000***	-4.056 -1.158
Treatment 6	1.509	.715	0.035**	.107 2.912
Treatment 7	-3.558	.522	0.000***	-4.990 -2.125
cons	9.545	.521	0.000	8.522 10.568

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 5: Levels of Trust in Combined Treatments Compared to Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2&3	-.542	.630	0.390	-1.779 .695
Treatment 4&6	1.362	.637	0.033**	.111 2.612
Treatment 5&7	-3.052	.637	0.000***	-4.303 -1.802

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Regression Models: Wilson-Patterson Model

Table 6:

Number of obs	1,245
F(20,1224)	5.23
Prob > F	0.0000
R-square	0.0723
Root MSE	6.8539

Table 6: Linear Regression of Cooperation in each Treatment Based on Score on the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.225	1.023	0.826	-2.232 1.782
Treatment 3	-1.163	1.034	0.261	-3.191 0.865
Treatment 4	2.640	1.040	0.011**	0.599 4.680
Treatment 5	-2.458	1.098	0.025**	-4.612 -0.304
Treatment 6	2.132	0.987	0.031**	0.196 4.067
Treatment 7	-3.766	1.025	0.000**	-5.778 -1.755
WP Conservative	-.618	1.133	0.586	-2.840 1.605
WP Neutral	.254	1.577	0.872	-2.839 3.348
T2 Cat 2	.496	1.540	0.748	-2.526 3.517
T2 Cat 3	.256	2.101	0.903	-3.866 4.379
T3 Cat 2	.660	1.655	0.690	-2.597 3.906
T3 Cat 3	-.768	2.178	0.724	-5.041 3.504
T4 Cat 2	-2.837	1.669	0.089	-6.110 0.437
T4 Cat 3	-3.638	2.203	0.099	-7.960 0.684
T5 Cat 2	-.700	1.562	0.654	-3.765 2.364
T5 Cat 3	.607	2.291	0.791	-3.888 5.101
T6 Cat 2	-1.147	1.557	0.462	-4.202 1.908
T6 Cat 3	-2.259	2.287	0.324	-6.745 2.228
T7 Cat 2	.689	1.619	0.671	-2.488 3.866
T7 Cat 3	-.167	2.153	0.938	-4.391 4.058
cons	9.714	0.747	0.000	8.249 11.180

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 7: Between Subject Effects. Wilson-Patterson Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservative	-.617	1.133	0.586	-2.840 1.605
T2. Conservative	.122	1.044	0.907	-2.169 1.926
T3. Conservative	.042	1.206	0.972	-2.324 2.409
T4. Conservative	-3.454	1.225	0.005**	-5.858 -1.050
T5. Conservative	-1.318	1.076	0.221	-3.429 0.793
T6. Conservative	-1.764	1.069	0.099*	-3.861 0.332
T7. Conservative	.072	1.157	0.951	-2.199 2.342
T1. Neutral	.254	1.577	0.872	-2.839 3.348
T2. Neutral	.511	1.389	0.713	-2.215 3.236
T3. Neutral	-.514	1.502	0.732	-3.461 2.433
T4. Neutral	-3.384	1.538	0.028**	-6.402 -0.365
T5. Neutral	.861	1.662	0.604	-2.400 4.122
T6. Neutral	-2.004	1.657	0.227	-5.254 1.246
T7. Neutral	.088	1.466	0.952	-2.789 2.964

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 8: Within Subject Effects. Wilson-Patterson Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2. Liberal	-.225	1.023	0.826	-2.232 1.782
T3. Liberal	-1.163	1.034	0.261	-3.191 0.865
T4. Liberal	2.640	1.040	0.0011**	0.599 4.680
T5. Liberal	-2.458	1.098	0.025**	-4.612 -0.304
T6. Liberal	2.132	0.987	0.031**	0.196 4.067
T7. Liberal	-3.766	1.025	0.000**	-5.778 -1.755
T2. Conservative	.271	1.151	0.814	-1.988 2.530
T3. Conservative	-.504	1.292	0.697	-3.039 2.032
T4. Conservative	-.197	1.305	0.880	-2.757 2.363
T5. Conservative	-3.158	1.111	0.005**	-5.339 -0.978
T6. Conservative	.985	1.205	0.414	-1.379 3.350
T7. Conservative	-3.077	1.253	0.014**	-5.536 -0.618
T2. Neutral	.031	1.835	0.986	-3.570 3.632
T3. Neutral	-1.032	1.917	0.314	-5.692 1.829
T4. Neutral	-.998	1.942	0.607	-4.808 2.812
T5. Neutral	-1.851	2.011	0.357	-5.796 2.094
T6. Neutral	-.127	2.063	0.951	-4.174 3.921
T7. Neutral	-3.933	1.893	0.038**	-7.648 -0.218

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 9: Logistic Regression Comparing the Probability of Voting to Redistribute Participant Payouts Between Liberals, Neutrals, and Conservatives. Orientation is Based on the Full Wilson-Patterson Scale. 0=Redistribute, 1= Not Redistribute. Liberals are Coded as the Reference Category.

Redistribute	Prob.	Std.	P> z	Conf Int.
Conservative	.122	0.242	0.616	-0.354 0.597
Neutral	.668	0.334	0.039**	0.035 1.342
cons	-.301	0.151	0.046	-0.596 -0.005

Brackets Denote Standard Errors. *= <0.100 **= <0.05. ***= <0.001

Table 10: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 Control Treatment by Political Orientation Across the Wilson-Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
WP Lib vs. Con T 2 & 3	-1.156	2.771	0.677	-6.591 4.280
WP Lib vs. Neut T2 & 3	.512	3.759	0.892	-6.862 7.887
WP Con vs Neut T 2 & 3	1.668	3.917	0.670	-6.017 9.353
WP Lib vs. Con T 4 & 6	3.983	2.788	0.153	1.487 9.454
WP Lib vs. Neut T 4 & 6	5.897	3.880	0.129	-1.716 13.509
WP Con vs Neut T 4 & 6	1.913	4.061	0.638	-6.053 9.880
WP Lib vs. Con T 5 & 7	.011	2.762	0.997	-5.407 5.430
WP Lib vs. Neut T 5 & 7	-.440	3.854	0.909	-8.002 7.122
WP Con vs Neut T 5 & 7	-.451	3.967	0.909	-8.235 7.332

Brackets Denote Standard Errors. *= <0.100 **= <0.05, ***= <0.001

Table 11: Within Subject Effects: Comparing Levels of Cooperation in Combined Treatments for Liberals, Neutrals, Conservatives Across the Wilson-Patterson Index, Relative to Control.

Treatment	Coef.	Std. Err	P> z	Conf Int
WP Lib T2 & T3	-1.388	1.797	0.440	-4.915 2.138
WP Con T2 & T3	-.233	2.108	0.912	-4.369 3.904
WP Neut T2 & T3	-1.900	3.301	0.565	-8.377 4.576
WP Lib T4 & T6	4.772	1.781	0.007**	1.278 8.265
WP Con T4 & T6	.788	2.146	0.713	-3.421 4.998
WP Neut T4 & T6	-1.125	3.447	0.744	-7.888 5.639
WP Lib T5 & T7	-6.224	1.837	0.001***	-9.827 -2.621
WP Con T5 & T7	-6.235	2.063	0.003**	-10.283 -2.188
WP Neut T5 & T7	-5.784	3.389	0.088*	-12.433 0.864

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Section 3: Regression Model by “Big 5” Personality Traits:

Table 12: Breusch-Pagan Test of Heteroskedasticity.
Extraversion Model.

Variables	Treatment#Attitudes
Chi2 (20)	7.59
Prob > Chi2	0.8690
P > 0.05* Denotes Significance	

Table 13: Linear Regression of the Interaction Between Treatment and Extraversion on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-1.057	1.651	0.522	-4.297 2.183
Treatment 3	-3.638	1.753	0.038	-7.076 -0.200
Treatment 4	.609	1.765	0.730	-2.854 4.072
Treatment 5	-3.308	1.747	0.058	-6.734 -0.119
Treatment 6	1.951	1.687	0.248	-1.358 5.260
Treatment 7	-3.617	1.627	0.026	-6.809 -0.425
Extra	-0.157	0.156	0.314	-0.463 0.149
T2 Extra	0.140	0.211	0.508	-0.247 0.554
T3 Extra	0.352	0.217	0.104	-0.073 0.777
T4 Extra	0.080	0.225	0.723	-0.362 0.522
T5 Extra	0.093	0.226	0.682	-0.351 0.537
T6 Extra	-.078	0.219	0.723	-0.507 0.625
T7 Extra	-0.008	0.208	0.970	-0.416 0.400
cons	10.688	1.221	0.000	8.293 13.083

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 14: Effect of Extraversion on Cooperation in each Treatment Compared to Extraverts in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.157	0.156	0.314	-0.463 0.149
Treatment 2	-.017	0.142	0.903	-0.296 0.261
Treatment 3	.195	0.150	0.194	-0.100 0.490
Treatment 4	-.077	0.162	0.634	-0.396 0.241
Treatment 5	-.064	0.164	0.694	-0.386 0.257
Treatment 6	-.235	0.154	0.126	-0.536 0.066
Treatment 7	-.165	0.138	0.231	-0.435 0.105

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 15: Breusch-Pagan Test of Heteroskedasticity.
Openness to Experience Model

Variables	Treatment#Attitudes
Chi2 (20)	8.01
Prob > Chi2	0.8432

P > 0.05* Denotes Significance

Table 16: Linear Regression of the Interaction Between Treatment and Openness to Experience on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	2.664	2.943	0.365	-3.109 8.437
Treatment 3	.712	3.112	0.819	-5.395 6.818
Treatment 4	2.085	2.944	0.479	-3.691 7.862
Treatment 5	-2.347	2.791	0.442	-8.086 3.391
Treatment 6	5.628	2.791	0.044	0.152 11.103
Treatment 7	-.752	2.931	0.798	-6.502 4.999
Open	.259	0.201	0.197	-0.135 0.653
T2 Open	-.272	0.284	0.339	-0.829 0.286
T3 Open	-.179	0.304	0.556	-0.776 0.418
T4 Open	-.088	0.290	0.763	-0.658 0.482
T5 Open	-.024	0.294	0.935	-0.601 0.553
T6 Open	-.416	0.276	0.132	-0.957 0.125
T7 Open	-.283	0.291	0.330	-0.854 0.287
cons	6.975	2.020	0.001	3.011 10.939

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 17: Effect of Openness on Cooperation in each Treatment Compared to Openness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.259	0.201	0.197	-0.135 0.653
Treatment 2	-.013	0.201	0.950	-0.407 0.382
Treatment 3	.080	0.229	0.726	-0.368 0.528
Treatment 4	.171	0.210	0.414	-0.240 0.583
Treatment 5	.235	0.215	0.274	-0.187 0.657
Treatment 6	-.157	0.189	0.406	-0.527 0.214
Treatment 7	-.024	0.210	0.908	-0.436 0.388

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 18: Breusch-Pagan Test of Heteroskedasticity.
Conscientiousness Model

Variables	Treatment#Attitudes
Chi2 (20)	10.39
Prob > Chi2	0.6617
P > 0.05* Denotes Significance	

Table 19: Linear Regression of the Interaction Between Treatment and
Conscientiousness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int	
Treatment 2	-6.726	3.179	0.035	-12.962	-0.489
Treatment 3	-1.996	3.553	0.574	-8.967	4.974
Treatment 4	3.109	3.520	0.377	-3.797	10.015
Treatment 5	-7.021	3.348	0.036	-13.590	-0.453
Treatment 6	3.472	3.049	0.255	-2.510	9.455
Treatment 7	-6.193	3.241	0.056	-12.551	0.165
Consc	-.233	0.209	0.266	-0.643	0.178
T2 Consc	.601	0.284	0.034	0.045	1.158
T3 Consc	.087	0.315	0.782	-0.531	0.705
T4 Consc	-.170	0.314	0.588	-0.787	0.446
T5 Consc	.401	0.306	0.190	-0.199	1.001
T6 Consc	-.194	0.276	0.483	-0.736	0.348
T7 Consc	-.239	0.294	0.417	-0.338	0.816
cons	12.110	2.302	0.000	7.594	16.626

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 20: Effect of Conscientiousness on Cooperation in each Treatment Compared to Conscientiousness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.233	0.209	0.266	-0.643 0.178
Treatment 2	.369	0.192	0.055*	-0.007 0.745
Treatment 3	-.145	0.236	0.537	-0.608 0.317
Treatment 4	-.403	0.234	0.086*	-0.863 0.057
Treatment 5	.168	0.223	0.452	-0.270 0.606
Treatment 6	-.426	0.181	0.018**	-0.781 -0.072
Treatment 7	.006	0.207	0.976	-0.400 0.412

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 21: Breusch-Pagan Test of Heteroskedasticity. Agreeableness Model

Variables	Treatment#Attitudes
Chi2 (20)	9.13
Prob > Chi2	0.7633

P > 0.05* Denotes Significance

Table 22: Linear Regression of the Interaction between Treatment and Agreeableness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-4.971	3.470	0.152	-11.779 1.837
Treatment 3	-5.543	3.553	0.119	-12.513 1.427
Treatment 4	-.659	3.623	0.856	-7.767 6.449
Treatment 5	-7.337	3.629	0.043	-14.456 -0.218
Treatment 6	-.958	3.377	0.777	-7.584 5.667
Treatment 7	-9.272	3.452	0.007	-16.044 -2.500
Agreeability	-.407	0.176	0.086	-0.871 0.058
T2 Agreeability	.455	0.307	0.139	-0.148 1.057
T3 Agreeability	.413	0.320	0.198	-0.215 1.040
T4 Agreeability	.163	0.330	0.621	-0.484 0.810
T5 Agreeability	.435	0.326	0.182	-0.204 1.075
T6 Agreeability	.217	0.307	0.480	-0.386 0.820
T7 Agreeability	.531	0.313	0.090	-0.083 1.145
cons	13.970	2.670	0.000	8.731 19.209

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 23: Effect of Agreeableness on Cooperation in each Treatment Compared to Agreeableness in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.407	0.237	0.086*	-0.871 0.058
Treatment 2	.048	0.196	0.806	-0.336 0.432
Treatment 3	.006	0.215	0.978	-0.417 0.429
Treatment 4	-.244	0.230	0.289	-0.695 0.207
Treatment 5	.029	0.224	0.898	-0.411 0.469
Treatment 6	-.189	0.196	0.335	-0.575 0.196
Treatment 7	.124	0.205	0.544	-0.278 0.527

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 24: Breusch-Pagan Test of Heteroskedasticity.
Emotional Stability Model

Variables	Treatment#Attitudes
Chi2 (20)	9.80
Prob > Chi2	0.7100

P > 0.05* Denotes Significance

Table 25: Linear Regression of the Interaction between Treatment and Emotional Stability on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.057	2.553	0.967	-4.903 5.114
Treatment 3	-.227	2.518	0.928	-5.166 4.713
Treatment 4	4.824	2.549	0.059	-0.176 9.825
Treatment 5	-.060	2.781	0.983	-5.516 5.395
Treatment 6	3.686	2.353	0.118	-.931 8.304
Treatment 7	.028	2.358	0.990	-4.598 4.655
Emotion Stability	.261	0.176	0.137	-0.083 0.606
T2 Emotion Stability	-.023	0.247	0.925	-0.507 0.461
T3 Emotion Stability	-.083	0.251	0.741	-0.575 0.409
T4 Emotion Stability	-.366	0.255	0.152	-0.865 0.134
T5 Emotion Stability	-.257	0.278	0.355	-0.803 0.288
T6 Emotion Stability	-.219	0.234	0.349	-0.678 0.240
T7 Emotion Stability	-.359	0.230	0.119	-0.812 0.093
cons	6.957	1.759	0.000	3.507 10.407

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 26: Effect of Emotional Stability on Cooperation in each Treatment Compared to Emotional Stability in Control Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.262	0.176	0.137	-0.083 0.606
Treatment 2	.238	0.173	0.170	-0.102 0.578
Treatment 3	.179	0.179	0.318	-0.172 0.530
Treatment 4	-.104	0.185	0.573	-0.466 0.258
Treatment 5	.004	0.215	0.984	-0.419 0.427
Treatment 6	.042	0.154	0.784	-0.261 0.345
Treatment 7	-.098	0.149	0.512	-0.391 0.195

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 27: Correlations Between Wilson-Patterson Index and the "Big 5" Personality Traits. Higher Scores on the Index are Associated with a Conservative Ideological Orientation.

Personality	Coef.	Std. Err	P> z	Conf Int
Openness	-.627	.089	0.000***	-0.801 -0.454
Extraversion	.248	.066	0.000***	0.118 0.378
Conscientiousness	.632	.099	0.000***	0.438 0.825
Agree	.219	.096	0.022**	0.031 0.406
Emotion Stability	.156	.084	0.064**	-0.009 0.321
Cons	-8.585	1.295	0.000	-11.126 -6.044

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Section 4: Regression Model By Attitudes Towards Inequality

Model Coding: (-4/-2=1 “liberal”) (-1=3 “neutral”) (0/4=2 “conservative”)

Table 28: Linear Correlation Between a Continuous Measure of Attitudes Towards Inequality on the Wilson Patterson Index and a Continuous Measure of Self-Report Measurement on a 7-point Likert Liberal-Conservative Scale

Liberal Conservative	Coef..	Std.	P> z	Conf Int.
Inequality	.275	.041	0.000	0.194 0.355
cons	4.092	.055	0.000	3.984 4.200

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 29: Leven’s Robustness Test Comparing the Variance in Cooperation Between Liberals, Neutrals, and Conservatives Based on Attitudes Towards Inequality on the Wilson Patterson Index

WorksCat	Mean	Std.	Freq.
Liberal	9.037	7.130	296
Conservative	9.028	7.134	716
Neutrals	8.682	6.749	233
Totals	8.965	7.058	1245
W0	1.205	df (1, 1242)	Pr > F= 0.300
W50	1.211	df (1,1242)	Pr > F= 0.298
W10	1.205	df(1, 1242)	Pr > F= 0.300

P >0.05* Denotes Significance

Table 30: Breusch-Pagan Test of Heteroskedasticity.
Inequality Attitudes Model.

Variables	Treatment#Attitudes
Chi2 (20)	13.85
Prob > Chi2	0.8382

P > 0.05* Denotes Significance

Table 31:

Number of obs	1,245
F(20,1224)	5.00
Prob > F	0.0000
R-square	0.0743
Root MSE	6.8464

Table 31: Linear Regression of Cooperation in each Treatment Based on Attitudes Towards of Inequality from the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-206	1.473	0.889	-3.096 2.683
Treatment 3	-1.614	1.414	0.254	-4.389 1.161
Treatment 4	4.433	1.544	0.004**	1.404 7.462
Treatment 5	-2.15	1.439	0.135	-4.973 0.673
Treatment 6	2.370	1.364	0.083*	-0.306 5.046
Treatment 7	-2.4	1.471	0.103	-5.287 0.487
Equality Con	1.751	1.276	0.170	-0.752 4.254
Equality Neutral	-0.595	1.315	0.651	-3.174 1.985
T2 Cat 2	-.735	1.768	0.678	-4.203 2.734
T2 Cat 3	2.066	2.139	0.334	-2.130 6.261
T3 Cat 2	.423	1.783	0.812	-3.075 3.922
T3 Cat 3	1.141	1.958	0.560	-2.701 4.982
T4 Cat 2	-5.602	1.880	0.003	-9.289 -1.914
T4 Cat 3	-1.213	2.077	0.559	-5.288 2.863
T5 Cat 2	-1.446	1.773	0.415	-4.924 2.032
T5 Cat 3	1.241	2.194	0.572	-3.063 5.546
T6 Cat 2	-1.554	1.714	0.365	-4.916 1.808
T6 Cat 3	-.775	1.944	0.690	-4.588 3.038
T7 Cat 2	-2.067	1.799	0.251	-5.596 1.461
T7 Cat 3	-.765	2.055	0.710	-4.797 3.266
cons	8.8	1.004	0.000	6.831 10.769

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 32: Between Subject Effects. Comparing Levels of Cooperation in each Treatment Based on Social Attitudes Towards Inequality on the Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservative	1.751	1.276	0.170	-0.752 4.254
T2. Conservative	1.016	1.224	0.407	-1.385 3.417
T3. Conservative	2.174	1.246	0.081*	-0.270 4.618
T4. Conservative	-3.851	1.380	0.005**	-6.559 -1.143
T5. Conservative	.305	1.231	0.805	-2.111 2.720
T6. Conservative	.197	1.144	0.864	-2.049 2.442
T7. Conservative	-.317	1.268	0.803	-2.804 2.171
T1. Neutral	-.595	1.315	0.651	-3.174 1.985
T2. Neutral	1.471	1.687	0.383	-1.838 4.780
T3. Neutral	.546	1.451	0.707	-2.301 3.392
T4. Neutral	-1.808	1.608	0.261	-4.963 1.348
T5. Neutral	.646	1.756	0.713	-2.800 4.092
T6. Neutral	-1.370	1.432	0.339	-4.179 1.439
T7. Neutral	-1.36	1.579	0.389	-4.458 1.738

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 33: Within Subject Effects. Levels of Cooperation Between same Category in each Treatment Compared to Control Based on Social Attitudes Towards Inequality on the Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
T2. Liberal	-.206	1.473	0.889	-3.096 2.683
T3. Liberal	-1.614	1.414	0.254	-4.389 1.161
T4. Liberal	4.433	1.544	0.004**	1.404 7.462
T5. Liberal	-2.150	1.439	0.135	-4.973 0.673
T6. Liberal	2.370	1.364	0.083*	-0.306 5.046
T7. Liberal	-2.400	1.471	0.103	-5.287 0.487
T2. Conservative	-.941	.978	0.336	-2.859 0.978
T3. Conservative	-1.191	1.086	0.273	-3.321 0.940
T4. Conservative	-1.169	1.072	0.276	-3.273 0.934
T5. Conservative	-3.596	1.036	0.001***	-5.628 -1.564
T6. Conservative	.816	1.038	0.432	-1.220 2.852
T7. Conservative	-4.467	1.034	0.000***	-6.496 -2.438
T2. Neutral	1.859	1.550	0.231	-1.182 4.901
T3. Neutral	-.473	1.354	0.727	-3.130 2.183
T4. Neutral	3.220	1.390	0.021**	0.493 5.946
T5. Neutral	-.909	1.656	0.583	-4.159 2.341
T6. Neutral	1.595	1.385	0.250	-1.122 4.312
T7. Neutral	-3.165	1.434	0.028**	-5.979 -0.351

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 34: Logistic Regression Comparing the Probability of Voting to Redistribute Participant Payouts Between Liberals, Neutrals, and Conservatives. Orientation is Based on Attitudes Towards Inequality. 1= Not Redistribute, 0=Redistribute. Liberals are Coded as the Reference Category.

Redistribute	Prob.	Std.	P> z	Conf Int.
Inequality Conservative	.364	.260	0.162	-0.146 0.875
Inequality Neutral	.233	.348	0.503	-0.450 0.915
cons	-.415	.218	0.057	-0.842 0.013

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 35: Within Subject Effects: Comparing Levels of Cooperation in Combined Treatments to Control Based on Attitudes Towards of Inequality from the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib Treat 2 & 3	-1.820	2.487	0.464	-6.699 3.059
Con Treat 2 & 3	-2.131	1.837	0.246	-3.290 1.473
Neut Treat 2 & 3	1.386	2.383	0.561	-3.290 6.062
Lib Treat 4 & 6	6.802	2.502	0.007**	1.894 11.710
Con Treat 4 & 6	-.353	1.862	0.850	-4.006 3.300
Neut Treat 4 & 6	4.815	2.300	0.037**	0.302 9.328
Lib Treat 5 & 7	-4.550	2.500	0.069*	-9.455 0.355
Con Treat 5 & 7	-8.063	1.839	0.000**	-11.672 -4.455
Neut Treat 5 & 7	-4.074	2.499	0.103	-8.976 0.828

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 36: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 and Control Treatment Based on Attitudes Towards of Inequality from the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib vs. Con T 2 & 3	.311	3.092	0.920	-5.755 6.377
Lib vs. Neut T 2 & 3	-3.206	3.444	0.352	-9.964 3.551
Con vs Neut T 2 & 3	-2.110	3.348	0.529	-8.678 4.459
Lib vs. Con T 4 & 6	7.156	3.119	0.022**	1.037 13.274
Lib vs. Neut T 4 & 6	1.988	1.988	0.559	-4.680 8.655
Con vs Neut T 4 & 6	-5.168	2.959	0.081**	-10.974 0.638
Lib vs. Con T 5 & 7	3.513	3.104	0.258	-2.576 9.602
Lib vs. Neut T 5 & 7	-.476	3.535	0.893	-7.410 6.458
Con vs Neut T 5 & 7	-3.989	3.103	0.199	-10.076 2.098

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Section 5:
Binary Regression Model: Attitudes towards Inequality

Model coding: (-4/-1=1 “liberal”) (0/4=2 “conservative”)

Table 37: Leven’s Robustness Test Comparing the Variance Between Liberals and Conservatives on Based on a Binary Measure of Attitudes Towards Inequality.

WorksCat	Mean	Std.	Freq.
Liberal	8.881	6.961	529
Conservative	9.028	7.134	716
Totals	8.965	7.058	1245
W0	0.852	df (1, 1243)	Pr > F= 0.356
W50	0.894	df (1,1243)	Pr > F= 0.345
W10	0.852	df(1, 1243)	Pr > F= 0.356

P >0.05* Denotes Significance

Table 38: Breusch-Pagan Test of Heteroskedasticity.
Alternative Binary Inequality Attitude Model.

Variables	Treatment#Attitudes
Chi2 (20)	8.65
Prob > Chi2	0.7989

P >0.05* Denotes Significance

Table 39:

Number of obs	1,245
F(13,1231)	7.27
Prob > F	0.0000
R-square	0.0713
Adj R-squared	0.0615
Root MSE	6.8379

Table 39: Linear Regression of Cooperation in each Treatment Based on Attitudes Towards of Inequality from the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	.778	1.080	0.471	-1.341 2.897
Treatment 3	-1.087	0.989	0.272	-3.027 0.853
Treatment 4	3.822	1.054	0.000***	1.753 5.891
Treatment 5	-1.629	1.077	0.131	-3.741 0.484
Treatment 6	2.135	0.980	0.030**	0.212 4.059
Treatment 7	-2.706	1.042	0.009**	-4.749 -0.663
Equality Con	2.011	1.0235	0.052*	-0.020 4.042
T2 Cat 2	-1.719	1.455	0.238	-4.574 1.136
T3 Cat 2	-0.104	1.466	0.944	-2.981 2.773
T4 Cat 2	-4.992	1.502	0.001	-7.937 -2.045
T5 Cat 2	-1.967	1.492	0.188	-4.895 0.960
T6 Cat 2	-1.320	1.426	0.355	-4.116 1.477
T7 Cat 2	-1.761	1.466	0.230	-4.637 1.114
cons	8.539	0.674	0.000	7.216 9.861

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 40: Between Subject Effects. Comparing Levels of Cooperation in each Treatment Based on Social Attitudes Towards Inequality on the Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservative	2.011	1.035	0.052*	-0.020 4.042
T2. Conservative	.292	1.023	0.775	-1.714 2.299
T3. Conservative	1.908	1.039	0.067*	-0.130 3.945
T4. Conservative	-2.980	1.088	0.006**	-5.114 -0.846
T5. Conservative	.044	1.075	0.967	-2.064 2.153
T6. Conservative	.692	0.980	0.481	-1.231 2.614
T7. Conservative	.25	1.038	0.810	-1.786 2.286

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 41: Within Subject Effects. Levels of Cooperation between same Category in each Treatment Compared to Control Based on Social Attitudes Towards Inequality on the Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
Liberal 2	.778	1.080	0.471	-1.341 2.897
Liberal 3	-1.087	0.989	0.272	-3.027 0.853
Liberal 4	3.822	1.054	0.000***	1.753 5.891
Liberal 5	-1.629	1.077	0.131	-3.741 0.484
Liberal 6	2.135	0.980	0.030**	0.212 4.059
Liberal 7	-2.706	1.042	0.009**	-4.749 -0.663
T2. Conservative	-.941	.975	0.335	-2.854 0.972
T3. Conservative	-1.191	1.082	0.272	-3.315 0.934
T4. Conservative	-1.169	1.069	0.274	-3.267 0.928
T5. Conservative	-3.596	1.033	0.001***	-5.623 -1.569
T6. Conservative	.816	1.035	0.431	-1.214 2.845
T7. Conservative	-4.467	1.031	0.000***	-6.490 -2.444

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 42: Logistic Regression Comparing the Probability of Voting to Redistribute Participant Payouts Between Liberals, Neutrals, and Conservatives. Orientation is Based on Attitudes Towards Inequality. 1= Not Redistribute, 0=Redistribute. Liberals are Coded as the Reference Category.

Redistribute	Prob.	Std.	P> z	Conf Int.
Inequality Conservative	.274	.221	0.216	-0.160 0.708
cons	-.324	.169	0.055	-0.657 0.08

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 43: Logistic Regression Comparing the Probability of Voting to Redistribute Participant Payouts Between Liberals and Conservatives. Orientation is Based on a Binary Measure of Attitudes Towards Inequality. 1= Not Redistribute, 0=Redistribute. Liberals are Coded as the Reference Category.

Redistribute	Liberal	Conservative	Total
Yes	83 58.04%	101 51.27%	184 54.12%
No	60 41.96%	96 48.73%	156 45.88%
cons	143 100%	197 100%	340 100%

Table 44: Within Subject Effects: Comparing Levels of Cooperation in Combined Treatments to Control Across the Inequality Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib Treat 2 & 3	-.309	1.748	0.860	-3.737 3.120
Con Treat 2 & 3	5.957	1.727	0.001***	2.569 9.345
Lib Treat 4 & 6	-4.335	1.776	0.015**	07.819 -0.851
Con Treat 4 & 6	-2.131	1.832	0.245	-5.726 1.463
Lib Treat 5 & 7	-.353	1.857	0.849	-3.996 3.289
Con Treat 5 & 7	-8.063	1.839	0.000**	-11.672 -4.465

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 45: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 Control Treatment by Political Orientation Across the Inequality Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib vs. Con T 2 & 3	1.823	2.532	0.472	-3.145 6.790
Lib vs. Con T 4 & 6	6.310	2.536	0.013**	11.336 11.286
Lib vs. Con T 5 & 7	3.728	2.553	0.144	-1.280 8.737

Brackets Denote Standard Errors. *= <0.100 **= <0.05, ***= <0.001

Section 6

Regression Model: Alternative Wilson Patterson Model

Model coding: (-21/-2=1 “liberal”) (-1/1=3 “neutral”) (2/21=2 “conservative”)

Table 46: Leven’s Robustness Test Comparing the Variance in Cooperation Between Liberals and Neutrals on the Wilson Patterson Index

WorksCat	Mean	Std.	Freq.
Liberal	9.513	7.122	667
Conservative	8.320	6.768	416
Neutral	8.370	7.375	162
Totals	8.965	7.058	1245
W0	1.835	df (1, 1242)	Pr > F= 0.160
W50	1.528	df (1,1242)	Pr > F= 0.217
W10	1.835	df(1, 827)	Pr > F= 0.160

P >0.05* Denotes Significance

Table 47: Breusch-Pagan Test of Heteroskedasticity. Alternative Wilson Patterson Coding.

Variables	Treatment#Attitudes
Chi2 (20)	13.85
Prob > Chi2	0.8382

P >0.05* Denotes Significance

Table 48:

Number of obs	1,245
F(20,1224)	5.33
Prob > F	0.0000
R-square	0.0747
Root MSE	6.8451

Table 48: Linear Regression of Cooperation in each Treatment Based on Score on the Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.414	.996	0.678	-2.368 1.540
Treatment 3	-1.416	1.011	0.162	-3.400 0.568
Treatment 4	2.412	1.016	0.018**	0.418 4.406
Treatment 5	-2.881	1.070	0.007**	-4.981 -0.781
Treatment 6	1.704	0.972	0.080**	-0.203 3.611
Treatment 7	-4.012	1.007	0.000**	-5.987 -2.037
WPX5 Conservative	-.903	1.123	0.421	-3.106 1.300
WPX5 Neutral	-1.000	1.692	0.555	-4.320 2.320
T2 Cat 2	.685	1.522	0.653	-2.302 3.672
T2 Cat 3	1.046	2.281	0.647	-3.429 5.521
T3 Cat 2	.912	1.641	0.578	-2.307 4.132
T3 Cat 3	.249	2.332	0.915	-4.325 4.824
T4 Cat 2	-2.609	1.654	0.115	-5.853 0.636
T4 Cat 3	-3.376	2.338	0.149	-7.963 1.211
T5 Cat 2	-.277	1.543	0.857	-3.304 2.750
T5 Cat 3	2.595	2.467	0.293	-2.244 7.435
T6 Cat 2	-.719	1.548	0.643	-3.756 2.319
T6 Cat 3	-.370	2.440	0.879	-5.158 4.417
T7 Cat 2	.935	1.608	0.561	-2.219 4.417
T7 Cat 3	.925	2.293	0.687	-2.219 4.089
cons	9.714	0.732	0.000	-3.572 11.436

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 49: Between Subject Effects. Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservative	-.903	1.123	0.421	-3.106 1.300
T2. Conservative	-.219	1.028	0.832	-2.235 1.799
T3. Conservative	.009	1.197	0.994	-2.339 2.357
T4. Conservative	-3.512	1.214	0.004**	-5.894 -1.130
T5. Conservative	-1.181	1.058	0.265	-3.237 0.895
T6. Conservative	-1.622	1.066	0.128	-3.712 0.469
T7. Conservative	.032	1.150	0.978	-2.225 2.229
T1. Neutral	-1.000	1.692	0.555	-4.320 2.320
T2. Neutral	.046	1.530	0.976	-2.955 3.047
T3. Neutral	-.751	1.604	0.640	-3.898 2.396
T4. Neutral	-4.376	1.613	0.007**	-7.541 -2.211
T5. Neutral	1.595	1.795	0.374	-1.936 5.117
T6. Neutral	-1.370	1.758	0.436	-4.820 2.079
T7. Neutral	-.075	1.547	0.961	-3.109 2.960

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 50: Within Subject Effects. Wilson Patterson Index

Treatment	Coef.	Std. Err	P> z	Conf Int
T2. Conservative	.271	1.151	0.814	-1.988 2.530
T3. Conservative	-.504	1.292	0.697	-3.039 2.032
T4. Conservative	-.197	1.305	0.880	-2.757 2.363
T5. Conservative	-3.158	1.111	0.005**	-5.339 -0.978
T6. Conservative	.985	1.205	0.414	-1.379 3.349
T7. Conservative	-3.077	1.253	0.014**	-5.536 -0.618
T2. Neutral	.632	2.052	0.758	-3.394 4.657
T3. Neutral	-1.167	2.101	0.579	-5.288 2.955
T4. Neutral	-.964	2.105	0.647	-5.095 3.166
T5. Neutral	-.286	2.223	0.898	-4.646 4.075
T6. Neutral	1.333	2.238	0.551	-3.058 5.724
T7. Neutral	-3.087	2.060	0.134	-7.128 0.954

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 51: Logistic Regression Comparing the Probability of Voting to Redistribute Participant Payouts Between Liberals, Neutrals, and Conservatives. Orientation is Based on Attitudes Towards Inequality. 1= Not Redistribute, 0=Redistribute. Liberals are Coded as the Reference Category.

Redistribute	Prob.	Std.	P> z	Conf Int.
Inequality Conservative	.096	.240	0.688	-0.373 0.566
Inequality Neutral	.703	.363	0.053*	-0.008 1.414
cons	-.275	.146	0.060	-0.562 0.012

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 52: Within Subject Effects: Comparing Levels of Cooperation in Combined Treatments to Control Across the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib Treat 2 & 3	-1.830	1.757	0.298	-5.277 1.617
Con Treat 2 & 3	-.233	2.108	0.912	-4.369 3.904
Neut Treat 2 & 3	-.535	3.644	0.883	-7.684 6.614
Lib Treat 4 & 6	4.115	1.746	0.0019**	0.689 7.542
Con Treat 4 & 6	.788	2.146	0.713	-3.421 4.998
Neut Treat 4 & 6	.369	3.755	0.992	-6.997 7.735
Lib Treat 5 & 7	-6.893	1.798	0.000***	-10.420 -3.367
Con Treat 5 & 7	-6.235	2.063	0.003**	-10.283 -2.188
Neut Treat 5 & 7	-3.373	3.720	0.365	-10.670 3.925

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 53: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 Control Treatment by Political Orientation Across the Wilson Patterson Index.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib vs. Con T 2 & 3	-1.597	2.744	0.561	-6.982 3.787
Lib vs. Neut T 2 & 3	-1.295	4.045	0.749	-9.232 6.642
Con vs Neut T 2 & 3	.302	4.210	0.943	-7.957 8.561
Lib vs. Con T 4 & 6	3.327	2.767	0.229	02.201 8.755
Lib vs. Neut T 4 & 6	3.746	4.141	0.366	-4.378 11.870
Con vs Neut T 4 & 6	.419	4.324	0.923	-8.065 8.903
Lib vs. Con T 5 & 7	-.658	2.736	0.810	-6.026 4.710
Lib vs. Neut T 5 & 7	-3.520	4.131	0.394	-11.626 4.585
Con vs Neut T 5 & 7	-2.863	4.253	0.501	-11.208 5.482

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 54: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 Control Treatment by Political Orientation Across the Inequality Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib vs. Con T 2 & 3	-1.597	2.744	0.561	-6.982 3.787
Lib vs. Con T 4 & 6	3.327	2.767	0.229	-2.101 8.755
Lib vs. Con T 5 & 7	-0.658	2.736	0.810	-6.026 4.710

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 55: Comparing Cooperation Between Treatments 2&3, 4&6, 5&7 Control Treatment by Political Orientation Across the Inequality Dimension.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib vs. Neut T 2 & 3	-1.295	4.045	0.749	-9.232 6.641
Lib vs. Neut T 4 & 6	3.746	4.141	0.336	-4.378 11.870
Lib vs. Neut T 5 & 7	-3.520	4.131	0.394	-11.626 4.585

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Appendix C:

Experiment 3: Effect of Normative Disagreement on Cooperation

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Section 1: Common Support: Implicit Attitude Model

Age by Score on the Implicit Attitude Measure.			
Age	Obs.	Mean.	Std.
Age	1081	35.937	11.885
Age Liberal	685	35.077	11.244
Age Conservative	396	38.424	12.799

Annual Income Levels by Implicit Attitude Measure.

Income	liberal	conservative	Total
\$0-\$15,000	146 21.31%	70 17.68%	216 19.98%
\$15,001-30,000	158 23.07%	81 20.45%	239 22.11%
\$30,001-\$45,000	140 20.44%	70 17.68%	210 19.43%
\$45,001-\$60,000	107 15.62%	60 15.15%	167 15.45%
\$60,001-\$75,000	64 9.34%	43 10.86%	107 9.90%
\$75,001-\$90,000	32 4.67%	26 6.57%	58 5.37%
\$90,0001-\$105,000	17 2.48%	19 4.80%	36 3.33%
\$105,001-\$120,000	6 0.88%	11 2.78%	17 1.57%
\$120,001-\$135,000	1 0.15%	8 2.02%	9 0.83%
\$135,001-\$150,000	5 0.73%	0 0.00%	5 0.46%
\$150,000+	9 1.31%	8 2.02%	17 1.57%
Total	685 100%	396 100%	1081 100%

Ethnicity by Implicit Attitude Measure.

Ethnic	Liberal	Conservative	Total
White	546 79.71%	339 85.61%	885 81.87%
Hispanic	31 4.53%	23 5.81%	54 5.00%
Asian	55 8.03%	17 4.29%	72 6.66%
Black	55 8.03%	12 3.03%	53 4.90%
Other	41 5.99%	5 1.26%	17 1.57%
Total	685 100%	396 100%	1081 100%

Sex by Implicit Attitude Implicit Measure.

Sex	Liberal	Conservative	Total
Male	318 46.42%	213 53.79%	531 49.12%
Female	367 53.58%	183 46.21%	550 50.88%
Total	685 100%	396 100%	1081 100%

Service Attendance by Implicit Attitude Measure.

Serve	Liberal	Conservative	Total
No Attendance	513 74.89%	203 51.26%	716 66.23%
Attendance	172 25.11%	193 48.74%	365 33.77%
Total	685	427	1081

Education by Implicit Attitude Measure.

Education	Liberal	Conservative	Total
Basic	100 14.60%	67 16.92%	167 15.45%
Intermediate	513 74.89%	281 70.96%	794 73.45%
Advanced	72 10.51%	48 12.12%	120 11.10%
Total	685 100%	396 100%	1081 100%

Section 2: Regression Models:

Correlations and Model Tests

Table 1: Participants by Self-report Liberal-Conservative Orientation on a 7-point Likert Scale.

Orientation	Obs.	Percent
Liberal	685	63.37%
Conservative	396	36.63%
Total	1081	100%

Table 2. Linear Regression of Scores on Self-Reported Liberal-Conservative Orientation on Score on the Implicit Attitude Measure. Ideological is Scored on a 7-point Likert Scale.

Ideology	Coef..	Std.	P> z	Conf Int.
Ideological Orientation	1.362	.043	0.000	1.278 1.445
cons	14.779	.185	0.000	14.416 15.141

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 3: Leven's Robustness Test Comparing the Variance in Cooperation Between Liberals and Conservatives Based on a Measure of Implicit Attitudes.

Ideology	Mean	Std.	Freq.
Liberal	3.888	2.231	685
Conservative	3.854	2.263	396
Totals	3.875	7.285	1081
W0	0.616	df (1, 134)	Pr > F= 0.433
W50	0.026	df (1,134)	Pr > F= 0.871
W10	0.616	df(1, 134)	Pr > F= 0.433

P >0.05* Denotes a Significance Difference in Variance

Overall Levels of Cooperation:

Table 4: Breusch-Pagan Test of Heteroskedasticity.
Norm Experiment.

Variables	Treatment#Attitudes
Chi2 (20)	12.01
Prob > Chi2	0.5271

P > 0.05* Denotes Significance

Table 5:

Number of obs	1,081
F(6,1074)	3.93
Prob > F	0.0007
R-square	0.0218
Root MSE	7.0024

Table 5: Linear Regression Model of the Effect of Treatment on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.414	0.704	0.557	-1.796 0.968
Treatment 3	-.844	0.703	0.230	-2.224 0.535
Treatment 4	-.331	1.327	0.803	-2.935 2.273
Treatment 5	2.304	1.204	0.056*	-0.058 4.666
Treatment 6	-2.427	0.697	0.001***	-3.794 -1.060
Treatment 7	-.324	0.706	0.646	-1.709 1.061
cons	9.281	0.506	0.000	8.288 10.274

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 6: Comparing Levels of Cooperation in Treatment 2 to All Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2- T3	.430	0.692	0.534	-0.926 1.787
T2- T4	-.083	1.321	0.950	-2.674 2.509
T2- T5	-2.718	1.197	0.023**	-5.066 -0.369
T2- T6	2.013	0.685	0.003**	0.669 3.357
T2- T7	-.090	0.694	0.897	-1.452 1.272

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 8: Comparing Levels of Cooperation Between Control Treatments and In-group Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
(T1-T2) – (T3- T6)	-1.169	0.982	0.234	-3.095 0.757
(T1-T2) – (T4- T5)	3.049	1.787	0.088*	-0.458 6.555

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Regression by Ideological Orientation

Table 9:

Number of obs	1,081
F(20,1060)	2.43
Prob > F	0.0004
R-square	0.0440
Root MSE	6.968

Table 9: Linear Regression of the Effect of a Two-way Interaction Between Treatment and Liberal-Conservative Ideology on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2 Liberal	-.078	0.916	0.932	-1.876 1.720
Treatment 3 Liberal	-1.642	0.872	0.060*	-3.354 0.070
Treatment 4 Liberal	-1.217	1.676	0.468	-4.505 2.072
Treatment 5 Liberal	3.279	1.502	0.029**	0.331 6.227
Treatment 6 Liberal	-2.548	0.878	0.004**	-4.272 -0.825
Treatment 7 Liberal	-0.124	0.901	0.891	-1.893 1.644
T1 Conservative	-1.25	1.026	0.223	-3.263 0.763
T2#Conservative	-.872	1.418	0.539	-3.656 1.911
T3#Conservative	2.142	1.474	0.147	-0.751 5.034
T4#Conservative	2.917	2.462	0.236	-1.913 7.747
T5#Conservative	-2.779	2.412	0.249	-7.513 1.954
T6#Conservative	.276	1.446	0.849	-2.562 3.113
T7#Conservative	-.528	1.443	0.715	-3.360 2.304
cons	9.75	0.657	0.000	8.461 11.039

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 10: Between Subject Effects. Levels of Cooperation in Conservatives as Compared to Liberals in each Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1. Conservatives	-1.25	1.026	0.223	-3.263 0.763
T2. Conservatives	-2.122	0.979	0.030**	-4.043 -0.200
T3. Conservatives	.892	1.059	0.400	-1.185 2.969
T4. Conservatives	1.667	2.238	0.457	-2.724 6.057
T5. Conservatives	-4.029	2.183	0.065*	-8.313 0.255
T6. Conservatives	-.974	1.019	0.339	-2.974 1.025
T7. Conservatives	-1.778	1.015	0.080*	-3.770 0.214

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 11: Within Subject Effects. Levels of Cooperation in Liberals and Conservatives Compared to Liberals and Conservatives in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2. Liberal	-.078	0.916	0.932	-1.876 1.720
T3. Liberal	-1.642	0.872	0.060*	-3.354 0.070
T4. Liberal	-1.217	1.676	0.468	-4.505 2.072
T5. Liberal	3.279	1.502	0.029**	0.331 6.227
T6. Liberal	-2.548	0.878	0.004**	-4.272 -0.825
T7. Liberal	-.124	0.901	0.891	-1.893 1.644
T2. Conservative	-.95	1.082	0.380	-3.074 1.174
T3. Conservative	.5	1.188	0.674	-1.831 2.831
T4. Conservative	1.7	1.803	0.346	-1.838 5.238
T5. Conservative	.5	1.887	0.791	-3.203 4.203
T6. Conservative	-2.273	1.149	0.048**	-4.527 -0.019
T7. Conservative	-.652	1.127	0.563	-2.864 1.560

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 12: Within Subject Effects. Comparing Levels of Cooperation in Liberals and Conservatives to Liberals and Conservatives in Treatment 2.

Treatment	Coef.	Std. Err	P> z	Conf Int
T2- T3 Liberal	1.563	0.859	0.069*	-0.122 3.249
T2- T4 Liberal	1.138	1.669	0.495	-2.126 4.413
T2- T5 Liberal	-3.358	1.494	0.025**	-6.290 -0.425
T2- T6 Liberal	2.470	0.865	0.004**	0.773 4.167
T2- T7 Liberal	.046	0.888	0.959	-1.697 1.788
T2- T3 Conservative	-1.45	1.158	0.211	-3.723 0.823
T2- T4 Conservative	-2.65	1.784	0.138	-6.150 0.850
T2- T5 Conservative	-1.45	1.869	0.438	-5.117 2.217
T2- T6 Conservative	1.323	1.118	0.237	-0.871 3.516
T2- T7 Conservative	-.298	1.096	0.786	-2.448 1.852

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 13: Within Subject Effects. Comparing Levels of Cooperation in Liberals and Conservatives to Liberals and Conservatives in Treatment.

Treatment	Coef.	Std. Err	P> z	Conf Int
T3- T4 Liberal	-.425	1.645	0.796	-3.653 2.803
T3- T5 Liberal	-4.921	1.468	0.001***	-8.802 -2.041
T3- T6 Liberal	.907	0.818	0.268	-0.699 2.512
T4- T5 Liberal	-4.496	2.050	0.029**	-8.519 -0.474
T4- T6 Liberal	1.332	1.648	0.419	-1.902 4.566
T5- T6 Liberal	5.828	1.471	0.000***	2.940 8.715
T3- T4 Conservative	-1.2	1.850	0.517	-4.829 2.429
T3- T5 Conservative	0.001	1.932	0.999	-3.791 3.791
T3- T6 Conservative	2.773	1.221	0.023**	0.377 5.168
T4- T5 Conservative	1.2	2.360	0.611	-3.431 5.831
T4- T6 Conservative	3.973	1.825	0.030**	0.393 7.553
T5- T6 Conservative	2.773	1.908	0.146	-0.971 6.516

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 14: Within Subject Effects. Comparing Levels of Cooperation Between Liberals in In-group and Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1-T2 Liberal	.078	0.916	0.932	-1.720 1.8 76
T3- T6 Liberal	.907	0.818	0.268	-0.699 2.511
T4- T5 Liberal	-4.496	2.050	0.029**	-8.519 -0.474
T1-T2 vs. T3- T6	-.828	1.228	0.500	-3.239 1.582
T1-T2 vs. T4- T5	4.574	2.245	0.042**	0.168 8.980
T3-T6 vs. T4- T5	5.403	2.207	0.015**	1.072 9.734

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 15: Within Subject Effects. Comparing Levels of Cooperation Between Conservatives in In-group and Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
T1-T2 Conservative	.950	1.082	0.380	-1.174 3.074
T3- T6 Conservative	2.773	1.221	0.023**	0.377 5.168
T4- T5 Conservative	1.200	2.360	0.611	-3.431 5.831
T1-T2 vs. T3- T6	-1.823	1.631	0.264	-5.024 1.378
T1-T2 vs. T4- T5	-2.900	3.753	0.440	-10.263 4.463
T3-T6 vs. T4- T5	1.573	2.657	0.554	-3.641 6.787

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 16: Between Subject Effects. Comparing Cooperation between Liberals and Conservatives in In-group and Out-group Treatments.

Treatment	Coef.	Std. Err	P> z	Conf Int
Lib T1-T2 vs. Con T1-T2	.872	1.418	0.539	-3.654 1.911
Lib T3-T6 vs. Con T3-T6	-1.866	1.469	0.204	-4.749 1.017
Lib T4-T5 vs. Con T4-T5	-5.696	3.126	0.069*	-11.830 0.438
Lib (T1-T2) – (T3-T6) Cob (T1-T2) – (T3-T6)	.994	2.042	0.626	-3.013 5.002
Lib (T1-T2) – (T4-T5) Cob (T1-T2) – (T4-T5)	4.824	3.433	0.160	-1.912 11.560
Lib (T3-T6) – (T4-T5) Cob (T3-T6) – (T4-T5)	3.830	3.454	0.269	-2.948 10.608

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Section 3: Personality Models

Table 17: Breusch-Pagan Test of Heteroskedasticity. Extraversion Model.

Variables	Treatment#Attitudes
Chi2 (20)	9.33
Prob > Chi2	0.7476

P > 0.05* Denotes Significance

Table 18: Linear Regression of the Effect of a Two-way Interaction Between Treatment and Extraversion on Levels of Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-1.591	1.602	0.321	-1.554 4.735
Treatment 3	-4.120	1.629	0.012	-7.316 -0.924
Treatment 4	1.175	3.177	0.711	-5.058 7.409
Treatment 5	1.553	2.447	0.526	-3.248 6.354
Treatment 6	-1.610	1.618	0.320	-4.784 1.564
Treatment 7	-1.095	1.701	0.520	-4.432 2.242
Extra	-0.022	0.148	0.880	-0.312 0.267
T2 Extra	-.298	0.202	0.140	-0.694 0.098
T3 Extra	.458	0.210	0.029	0.046 0.870
T4 Extra	-.216	0.399	0.588	-0.999 0.567
T5 Extra	.117	0.345	0.735	-0.560 0.794
T6 Extra	-.114	0.204	0.577	-0.515 0.287
T7 Extra	-.106	0.213	0.619	-0.312 0.525
cons	9.437	1.168	0.000	7.146 11.728

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 19: Effect of Extraversion on Cooperation in each Treatment Compared to Extraverts in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.022	0.148	0.880	-0.312 0.267
Treatment 2	-.321	0.138	0.020**	-0.591 0.050
Treatment 3	.435	0.149	0.004**	0.143 0.728
Treatment 4	-.238	0.371	0.520	-0.966 0.489
Treatment 5	.094	0.312	0.761	-0.517 0.707
Treatment 6	-.136	0.141	0.335	-0.414 0.141
Treatment 7	.084	0.154	0.586	-0.218 0.386

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 20: Breusch-Pagan Test of Heteroskedasticity. Openness to Experience Model.

Variables	Treatment#Attitudes
Chi2 (20)	11.63
Prob > Chi2	0.5582

P > 0.05* Denotes Significance

Table 21: Linear Regression of the Effect of the a Two-way Interaction Between Treatment and Openness to Experience on Levels of Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.835	2.939	0.532	-3.931 7.602
Treatment 3	-2.777	3.101	0.371	-8.862 3.307
Treatment 4	1.327	6.156	0.829	-10.752 13.405
Treatment 5	2.006	3.986	0.615	-5.815 9.826
Treatment 6	.978	2.911	0.737	-4.735 6.690
Treatment 7	-.535	3.174	0.866	-6.763 5.694
Open	.086	0.223	0.700	-0.353 0.525
T2 Open	-.228	0.287	0.428	-0.792 0.336
T3 Open	-.194	0.300	0.518	-0.394 0.782
T4 Open	-.163	0.598	0.785	-1.337 1.010
T5 Open	.033	0.402	0.935	-0.756 0.822
T6 Open	-.343	0.288	0.234	-0.908 0.222
T7 Open	.019	0.309	0.950	-0.586 0.624
cons	8.418	2.258	0.000	3.987 12.850

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 22: Effect of Openness on Cooperation in each Treatment Compared to Openness in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.086	0.224	0.700	-0.353 0.525
Treatment 2	-.142	0.180	0.432	-0.496 0.212
Treatment 3	.280	0.199	0.161	-0.111 0.671
Treatment 4	-.077	0.554	0.889	-1.165 1.011
Treatment 5	.119	0.334	0.722	-0.537 0.774
Treatment 6	-.257	0.181	0.157	-0.612 0.099
Treatment 7	.105	0.212	0.619	-0.311 0.522

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 23: Breusch-Pagan Test of Heteroskedasticity.
Conscientiousness Model.

Variables	Treatment#Attitudes
Chi2 (20)	10.03
Prob > Chi2	0.6918
P > 0.05* Denotes Significance	

Table 24: Linear Regression of the Effect of a Two-way the Interaction Between
Treatment and Conscientiousness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-.195	3.339	0.953	-6.747 6.357
Treatment 3	-.326	3.503	0.926	-7.200 6.548
Treatment 4	-.832	6.241	0.894	-13.079 11.414
Treatment 5	2.005	5.592	0.720	-8.968 12.978
Treatment 6	-1.415	3.446	0.681	-8.176 5.346
Treatment 7	1.449	3.380	0.668	-5.184 8.081
Consc	-.096	0.218	0.659	-0.523 0.331
T2 Consc	-.022	0.299	0.941	0.608 0.564
T3 Consc	-.045	0.308	0.884	-0.650 0.560
T4 Consc	.044	0.586	0.940	-1.106 1.195
T5 Consc	.025	0.501	0.960	-0.958 1.009
T6 Consc	-.090	0.306	0.769	-0.690 0.510
T7 Consc	-.160	0.301	0.595	-0.752 0.431
cons	10339	2.414	0.000	5.603 15.075

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 25: Effect of Conscientiousness on Cooperation in each Treatment Compared to Conscientiousness in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	-.096	0.218	0.659	-0.523 0.331
Treatment 2	-.118	0.204	0.563	-0.519 0.283
Treatment 3	-.141	0.218	0.519	-0.570 0.288
Treatment 4	-.051	0.544	0.925	-1.120 1.016
Treatment 5	-.071	0.452	0.876	-0.957 0.816
Treatment 6	-.186	0.215	0.387	-0.608 0.236
Treatment 7	-.256	0.208	0.219	-0.666 0.153

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 26: Breusch-Pagan Test of Heteroskedasticity. Emotional Stability Model.

Variables	Treatment#Attitudes
Chi2 (20)	17.17
Prob > Chi2	0.1914

P >0.05* Denotes Significance

Table 27: Linear Regression of the Effect of a Two-way Interaction Between Treatment and Emotional Stability on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	-1.970	2.183	0.367	-6.253 2.314
Treatment 3	-1.313	2.252	0.560	-5.733 3.106
Treatment 4	5.044	4.310	0.242	-3.413 13.501
Treatment 5	-1.813	4.192	0.665	-10.038 6.412
Treatment 6	-5.602	2.189	0.011	-9.898 -1.306
Treatment 7	3.106	2.347	0.186	-1.500 7.712
Emotional Stability	.076	0.164	0.643	-0.247 0.399
T2 Emotional S	.158	0.221	0.475	-0.276 0.593
T3 Emotional S	.045	0.226	0.841	-0.398 0.488
T4 Emotional S	-.522	0.428	0.224	-1.362 0.319
T5 Emotional S	.423	0.394	0.283	-0.350 1.196
T6 Emotional S	.318	0.223	0.154	-0.120 0.756
T7 Emotional S	-.344	0.237	0.146	-0.809 0.120
cons	8.526	1.587	0.000	5.412 11.640

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 28: Effect of Emotional Stability on Cooperation in each Treatment Compared to Emotional Stability in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.076	0.165	0.643	-0.247 0.399
Treatment 2	.234	0.148	0.114	-0.056 0.525
Treatment 3	.122	0.154	0.431	-0.181 0.424
Treatment 4	-.445	0.395	0.260	-1.221 0.330
Treatment 5	.499	0.358	0.163	-0.203 1.202
Treatment 6	.395	0.151	0.009	0.099 0.690
Treatment 7	-.268	0.170	0.116	-0.602 0.066

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 29: Breusch-Pagan Test of Heteroskedasticity.
Agreeableness Model.

Variables	Treatment#Attitudes
Chi2 (20)	10.36
Prob > Chi2	0.6645
P > 0.05* Denotes Significance	

Table 30: Linear Regression of the Effect of a Two-way Interaction between Treatment and Agreeableness on Cooperation.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 2	1.361	2.924	0.642	-4.377 7.099
Treatment 3	.101	3.194	0.975	-6.167 6.368
Treatment 4	.205	4.953	0.967	-9.514 9.924
Treatment 5	.746	5.274	0.888	-9.603 11.094
Treatment 6	-.330	3.062	0.914	-6.338 5.677
Treatment 7	1.071	2.992	0.720	-4.799 6.941
Agreeableness	.092	0.176	0.622	-0.273 0.456
T2 Agreeableness	-.171	0.276	0.536	-0.712 0.370
T3 Agreeableness	-.091	0.295	0.759	-0.670 0.488
T4 Agreeableness	-.050	0.476	0.916	-0.984 0.884
T5 Agreeableness	.158	0.491	0.748	-0.805 1.120
T6 Agreeableness	-.198	0.282	0.483	-0.752 0.256
T7 Agreeableness	-.134	0.279	0.633	-0.682 0.415
cons	8.327	1.946	0.000	4.508 12.147

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 31: Effect of Agreeableness on Cooperation in each Treatment Compared to Agreeableness in Treatment 1.

Treatment	Coef.	Std. Err	P> z	Conf Int
Treatment 1	.092	0.186	0.622	-0.273 0.456
Treatment 2	-.079	0.204	0.698	-0.480 0.321
Treatment 3	.001	0.230	0.997	-0.450 0.451
Treatment 4	.041	0.439	0.925	-0.819 0.902
Treatment 5	.249	0.454	0.583	-0.642 1.140
Treatment 6	.106	0.213	0.617	-0.523 0.311
Treatment 7	-.042	0.209	0.841	-0.452 0.368

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Table 32: Correlations Between Implicit Attitude Measure and the "Big 5" Personality Traits. Higher Scores on the Implicit Attitude Measure are Associated with a Conservative Ideological Orientation.

Variable	Coef.	Std. Err	P> z	Conf Int
Openness	-.371	0.045	0.000***	-0.460 -0.281
Extraversion	.056	0.035	0.109	-0.012 0.125
Conscientiousness	.244	0.049	0.000***	0.145 0.343
Agree	-.167	0.048	0.000***	-0.261 -0.073
Emotion Stability	.099	0.042	0.019**	0.016 0.181
Cons	21.499	0.657	0.000	20.209 22.788

Brackets Denote Standard Errors. * = <0.100 ** = <0.05, *** = <0.001

Section 4

Treatment 7 Images

Image 1



Image 2



Image 3



Appendix D

Full Implicit Attitude Measure: Smith et al., 2011

Traditional Values/Moral Codes

Society works best when . . .

- 1-People live according to traditional values
- 2-People adjust their values to fit changing circumstances

Society works best when . . .

- 1-Behavioral expectations are based on an external code
- 2-Behavioral expectations are allowed to evolve over the decades

Society works best when . . .

- 1-Our leaders stick to their beliefs regardless
- 2-Our leaders change positions whenever situations change

Out-groups/Rule breakers

Society works best when . . .

- 1-People realize the world is dangerous
- 2-People assume all those in far away places are kindly

Society works best when . . .

- 1-We take care of our own people first
- 2-We realize that people everywhere deserve our help

Society works best when . . .

- 1-Those who break the rules are punished
- 2-Those who break the rules are forgiven

Society works best when . . .

- 1-Every member contributes
- 2-More fortunate members sacrifice to help others

Role of Group/Individual

Society works best when . . .

- 1-People are rewarded according to merit
- 2-People are rewarded according to need

Society works best when . . .

- 1-People take primary responsibility for their welfare
- 2-People join together to help others

Society works best when . . .

- 1-People are proud they belong to the best society there is
- 2-People realize that no society is better than any other

Leadership

Society works best when . . .

- 1-Our leaders are obeyed
- 2-Our leaders are questioned

Society works best when . . .

- 1-Our leaders call the shots
- 2-Our leaders are forced to listen to others

Absolutes

Society works best when . . .

- 1-People recognize the unavoidable flaws of human nature
- 2-People recognize that humans can be changed in positive ways

Society works best when . . .

- 1- Our leaders adhere to their principles no matter what
- 2- Our leaders compromise with their opponents in order to get things done

21-Point Wilson-Patterson Index:
Smith et al., 2011

Please indicate whether you agree or disagree with the following. (Agree, Disagree, Uncertain)

1. School prayer
2. Pornography
3. Illegal immigration
4. Women's equality
5. Death penalty
6. Patriot Act
7. Premarital sex
8. Gay marriage
9. Abortion rights
10. Patriotism
11. Biblical truth
12. Iraq War
13. Welfare spending
14. Tax cuts
15. Gun control
16. Military spending
17. Warrantless searches
18. Pollution control
19. Small government
20. Foreign aid
21. Free trade

Big 5 Personality Measure: Ten-Item Personality Inventory (TIPI)
Gosling, Rentfrow, and Swan 2003

Participants indicate how each measure relates to them on a 7-point scale: 1) Disagree strongly 2) Disagree moderately 3) Disagree a little 4) Neither agree nor disagree 5) Agree a little 6) Agree moderately 7) Agree strongly

I see myself as....

1. Extraverted, Enthusiastic.
2. Critical, Quarrelsome
3. Dependable, Self-Disciplined
4. Anxious, Easily Upset
5. Open to New Experience, Complex
6. Reserved, Quiet
7. Sympathetic, Warm
8. Disorganized, Careless
9. Calm, Emotionally Stable
10. Conventional, Uncreative

TIPI scale scoring (“R” denotes reverse-scored items): Extraversion: 1, 6R; Agreeableness: 2R, 7; Conscientiousness: 3, 8R; Emotional Stability: 4R, 9; Openness to Experiences: 5, 10R.