



2016

## Neural Correlates of Political Attitudes: Emotion and Ideology in the Brain

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**LOYOLA UNIVERSITY CHICAGO**

**NEURAL CORRELATES OF POLITICAL ATTITUDES:**

**EMOTION AND IDEOLOGY IN THE BRAIN**

**A DISSERTATION SUBMITTED TO**

**THE FACULTY OF THE GRADUATE SCHOOL**

**IN CANDIDACY FOR THE DEGREE OF**

**DOCTOR OF PHILOSOPHY**

**PROGRAM IN POLITICAL SCIENCE**

**BY**

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**CHICAGO, ILLINOIS**

**AUGUST 2016**

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## **ABSTRACT**

Do conservatives and liberals have differing sensitivities to avoidance, inhibition, and negative emotion? Do psychological factors beneath our conscious awareness underlie the political ideologies we embrace? Political science researchers have broken new ground over the past ten years in our understanding of the psychology and physiology of political ideology. However, large questions remain about how political ideology may be related to avoidance motivations and negative emotion. This work expands our current knowledge in this area by presenting three studies with multiple methodologies: original survey data, electroencephalographic measurements, and behavioral experiments in a lab setting. Working in the tradition of J.A. Gray's dual systems of behavioral motivation, I explore how political ideology is related to several related dispositional measures of behavioral avoidance, behavioral inhibition, and negative affectivity. Overall, and in contrast to literature expectations, my evidence suggests that liberals and conservatives do not have persistent differences in avoidance sensitivity or negativity bias. While strong evidence remains demonstrating important dispositional differences between liberals and conservatives, additional research will be required before researchers can conclude that conservatives are uniquely motivated by psychological avoidance or negative affect.

## CHAPTER ONE

### INTRODUCTION

According to the Oxford New Monitor Corpus in October 2014, insults levied at Democrats and Republicans have taken an especially explosive turn in recent times. A sample of 1200 negative phrases gathered from online sources reveals incredible negativity and no small amount of creativity (Martin 2014). The right accuses the left of being loons, twits, nitwits, trash, hippies, morons, hypocrites, fools, scum, and elitists. The left responds in kind against the conservatives with labels such as fanatics, obstructionists, extremists, misogynists, ideologues, zealots, nut-jobs, thugs, and crazies. The only thing they seem to agree about is that the other guys can best be described as “idiots.”

Although the lists of commonly used insults includes terms such as “extremist” and “ideologue,” accusing someone of being an ideologue is not the same insult that it once was. The most common ideological labels used in American politics—liberal and conservative—are typically used as descriptors, not insults. Political candidates in the modern era often run toward these labels, particularly Republicans towards the term “conservative.” Democrats often prefer “progressive” instead of “liberal” but the two terms are indistinguishable in terms of meaning. These ideological labels function as a kind of summary statement of the beliefs held by an individual. The summary



statements are readily used to bolster credentials and signal intentions. Politicians self-identify as either conservative or liberal, using these labels to help their political brand.

But this is a modern innovation. As I will explain in Chapter Two, for two centuries, political ideology *itself* was an insult, a slur thrown at you by your political rivals. An accusation of ideology meant you had tremendous bias, close-mindedness, and living in false consciousness. Your political opponents used these charges to galvanize their supporters towards (or against) political revolution. Being called an “ideologue” was an incendiary accusation that you made a practice of systematically distorting facts, figures, and events to obfuscate the truth and manipulate people. Political ideology was thought to be a blinding worldview which made one unreliable and untrustworthy.

### **The modern understanding of political ideology**

Beginning with Philip Converse’s seminal paper (1964), political ideology came to take on a useful technical definition. Converse described political ideology as a structured collection of abstract values by which one understands the political and social environment. Political ideology crystalizes and communicates shared values in political outlook. In other words, political ideology is a lens by which to understand the world.

Converse famously introduced the idea of constraint to political ideology. If a person is truly ideological, holding viewpoints on some issues ought to constrain their viewpoints on others. For example, imagine your friend is pro-gun, pro-religion, pro-free

trade, anti-minimum wage, and pro-small government. Scanning that list of issues, you might surmise that your friend was motivated by several abstract principles, including favoring the free market, distrust of national government, and favoring freedom, individualism, and responsibility.

Given that belief structure, now take a moment to predict your friend's stance on nationalized healthcare. Given the abstract values described above, and the closeness of these views to American conservatism, you might guess they would be opposed to nationalized healthcare. Are you right? Probably, yes. While it is possible that your friend's viewpoints are not motivated by abstract principles—perhaps they have randomly acquired their views purely by luck or purely in mimicry of another person—it seems unlikely they would have acquired this interrelated portfolio without an underlying set of abstract political values to build on. This is political ideology. As I will discuss further in Chapter Two, while Converse found that few people outwardly recognized their beliefs as ideological, we have good reason to suspect that many people hold beliefs in recognizable ideological patterns without being able to articulate them.

How common is political ideology? Converse, writing in the 1960s, estimated that only 1 in 10 Americans were truly ideological, a very low number that seems to have surprised him and our discipline. To assess their political beliefs, Converse interviewed a sample of Americans and had independent judges assess whether abstract political values were directly expressed during the conversations. Michael

Lewis-Beck and colleagues, updating Converse into the 2000s with a deliberately similar technique, note that this number had doubled to 1 in 5 Americans (Lewis-Beck et al., 2008). The remaining Americans held political beliefs not anchored to abstract values, but instead clustered around either group interests or the current state of the country. Or they simply had no issue content whatsoever to the political views they reported (for example, identifying with a political party but being unable to articulate even a vague understanding of what the party stood for).

Still, if only 20 percent of the American public is ideological, why are political scientists so interested in political ideology? As noted by social psychologist John Jost, a person need not be consciously aware of their ideology (Jost et al. 2006). They are not required to recognize or understand their own belief structure for it to be guiding their political behavior. Ideological principles may be latent or implicit to the individual, an unidentified engine under the hood of a car driven to work every day. The studies of Converse and Lewis-Beck put a high burden on participants. These participants must have sophisticated political awareness to be able to verbalize how their abstract conception of politics fits into representational political schema. Jost argues that a latent belief structure can guide attitude formation without the individual actually being aware of it, or without them being able to name it. One does not need to be able to describe or categorize the physics of internal combustion engines in order to drive the car. Regardless of your understanding of what is happening under the hood, your ride is still deeply affected by the engine. Consistent with this argument, as will be detailed in

Chapter Two, researchers today have found considerably more evidence that the mass public is ideological than what Converse was able to detect earlier.

The concept of ideology as an abstract belief structure has proven to be exceptionally useful for political scientists. According to one estimate, more than 50 percent of all papers published in the *American Political Science Review* (the top journal in our discipline) include the word ideology (Knight 2006, 620). One central concern in the political psychology subfield is the question of where do beliefs come from, and many literatures within the political behavior subfield have found use for Converse's definition of political ideology.

### **Political ideology, emotion, and political psychology**

Where does political ideology come from? Our best answer is that political ideology is shaped by culture, environmental forces, elites, personal relations, personality dispositions, and evolutionary origins. Our field is increasingly taking a wide viewpoint on the origins of political attitudes. On the cutting edge of these questions are the new political behaviorists who are integrating insights from many scientific fields to improve our understanding of political attitudes, fields including political science, social psychology, political psychology, and cognitive neuroscience.

For example, political scientists are increasingly noticing the connection between emotion and politics. George Marcus and colleagues proposed the Affective Intelligence theory, demonstrating how emotional states of enthusiasm and anxiety have a large impact on political learning and political information processing (Marcus et al. 2000).

Ted Brader's study of campaign advertisements outlined how politicians can (and do) use emotionally infused advertisements to affect political attitudes and behavior (Brader 2005, 2006).

But nowhere has the study of ideology been more riveting than in the political psychology and biology of political ideology. Kevin Smith, John Hibbing, John Alford, and their colleagues and students report study after study of the physiological correlations to political attitudes (e.g. Alford et al. 2005; Alford and Hibbing 2008; Smith et al. 2011), drawing particular attention to the role of threat and negative affect in political conservatives (Oxley et al. 2008; Dodd et al. 2012). John Jost and colleagues have connected threat, fear and uncertainty to political conservatism, arguing that political ideology is motivated by the individual's cognitive, emotional, and social needs (Jost et al. 2003). This recent wave of heavy lifting on the subject of political ideology has been initiated by political scientists growing access to methodologies, training, and data from other disciplines.

Political scientists have long been interested in how political attitudes are formed, and now we are realizing the importance of understanding how emotion relates to political attitude formation. Psychologists and neuroscientists have waged pitched battles over the relation of cognition to emotion (Zajonc 1980; Lazarus 1982; Zajonc 1984; Leventhal and Scherer 1987; Gray 1990; Pessoa 2008), and these arguments have defined significant portions of psychology and cognitive neuroscience (these six papers listed immediately above have over 11,000 citations). We are still waiting for the dust

to settle on a conclusive understanding of emotion and cognition, but it has become increasingly clear that emotion has a highly integrated role in cognitive processing. And, so, political science—a “borrower” discipline from its very founding—will also need to consider more fully the importance of emotion for cognition.

### **Rising study of physiological politics in political science**

The core project of the political psychology of ideology is to understand how differences in political ideology are related to the vast array of cognitive, emotional, and physiological factors that predict or explain political attitudes. Broadly, most of the work from researchers in this field operate from one of two different perspectives.

The first perspective was developed by political scientists John Hibbing, Kevin Smith, John Alford, and the University of Nebraska-Lincoln Political Physiology Lab. Their theory, which I call the Negativity Bias Theory, focuses on emotional sensitivity, specifically the theory that conservatives are dispositionally more sensitive to negative emotion. Their perspective on the psychological differences between liberals and conservatives has been shaped by dozens of studies that look at genetic and physiological differences in people. In 2014, Hibbing and colleagues published a paper called “Differences in Negativity Bias Underlie Variations in Political Ideology” which summarizes a great host of their work, and integrates the findings into a central theory.

The second perspective comes out of social psychology. The ‘Motivated Social Cognition Theory’ is based on the work of psychologist John Jost and many colleagues, and it argues that conservatism is motivated by a network of psychological factors

related to fear, threat, and reducing uncertainty. According to Jost and colleagues, two primary factors divide liberals and conservatives: first, advocating versus resisting social change (as opposed to tradition) and second, rejecting versus accepting inequality (Jost et al. 2003, Jost 2006, Jost and Amodio 2012). In their important seminal paper (Jost et al. 2003), they conduct a meta-analysis on the psychology of political conservatism, and they discovered that these two factors are highly correlated with personality traits, dispositions, and psychological motivations related to fear, threat, and reducing uncertainty.

In our literature so far, these two perspectives have been considered largely complementary. The findings and theories have substantial overlap and there is much cross citation. In my view, however, the two theories are conceptually different. Hibbing and colleagues have focused on physiological differences between liberals and conservatives, and they tie their theory together through emotions. Psychologist John Jost's work focuses on differences in psychological processes and motivations, but does not home in on negative affect specifically. Jost's work has a strong connection to motivational avoidance. Both of these projects are tremendously important to work on political ideology by political psychologists. However, given the breadth of psychological factors and physiological dispositions that humans have, it is not surprising that a great deal of additional work must be done to deepen our understanding of the political psychology of ideology. Our theories can only mature by enlarging the scope of psychological factors that are being investigated.

## **Purpose of Dissertation**

This dissertation has one primary objective: to expand our knowledge about how negative emotional sensitivity and avoidance motivations are related to political ideology at the root level of the individual, operating before (or outside of) political stimuli. I propose one useful place to expand our understanding of negative affect and avoidance motivations is through the work of Jeffrey Allen Gray, a British psychologist and cognitive neuroscientist. Gray developed a dual model of behavioral motivation to explain how and why cognition and emotion lead to behavior. According to Gray, animals have a appetitive system of behavioral activation that engages in goal pursuit, while also having a aversive system of behavioral inhibition that monitors the environment for changing information and threats. As I will explain, Gray's theories combine cognition and emotion in a way that would benefit the theories of Hibbing's Negativity Bias Theory and Jost's Motivated Social Cognition Theory. By exploring the meaning of Gray's theories for political ideology, we will have an opportunity to sharpen several elements of the political psychology theories that have been proposed.

This dissertation presents data from three studies aimed to clarify the specific role of avoidance motivation and sensitivity to negative emotion in political ideology. These sets of questions have always been interdisciplinary in nature, and this dissertation is no different. I employ survey methodology alongside cognitive neuroscience methodology to approach these important questions from multiple



perspectives. Along the way, I take the opportunity to outline how the theories of Hibbing and Jost have similarities and a few important differences in predictions.

This dissertation will proceed as follows. Chapter Two details the use of political ideology by political scientists and clarifies how the biology and politics research program contributes to these important questions. Chapter Three summarizes the core theories of the political psychology of ideology that are under investigation in this dissertation. Chapter Four describes and characterizes the participant pool for two behavioral experiments while also testing for dispositional correlations. Chapter Five presents the results of an electroencephalography study of frontal cortical asymmetry and its implications for political ideology. Chapter Six presents additional electroencephalography work, this time from a behavioral experiment called the Go/No-Go task. Chapter Seven concludes the dissertation with a discussion of implications.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

Do psychological factors beneath our conscious awareness underlie the political ideologies we embrace? Political science researchers have broken new ground over the past ten years in our understanding of the psychology and physiology of political ideology. This chapter outlines a general research program for studying dispositional differences in liberals and conservatives. My approach is interdisciplinary, and I borrow from political science, social psychology, and cognitive neuroscience to better understand the study of political ideology.

A brief preview of the chapter's findings may be useful here. The reader should see the importance of political ideology for understanding political attitude formation and should better understand the complexity of measuring ideology in the mass public. The reader will also see that while political scientists have made serious advances in the past two decades to understand the cognitive and affective processes of political attitude formation, we still have many questions remaining. We will see that political psychology literature increasingly finds that political conservatism is correlated with negative affect and/or avoidant behavioral motivations, but these associations leave several important questions unexplored. Finally, the reader will also note the importance of multidisciplinary work for this research program. Psychology and

cognitive neuroscience have considerably more advanced techniques and theories to investigate cognitive and affective differences between individuals. However, psychology often neglects to fully consider the multidimensionality of political ideology, which compromises the applicability of those findings for political science questions. Approaching our questions from multiple disciplines bolsters several weaknesses in analysis.

There are two major theories concerning the psychological differences between political liberals and conservatives. First, the Motivated Social Cognition Theory posits that differences in psychological factors (traits, dispositions, cognitive styles) suggest conservatives are more motivated by needs to reduce uncertainty, ambiguity, threat, and disgust than liberals (Jost et al. 2003). Later, I outline an interpretation of this theory as describing conservatives as being motivated by avoidance. Second, the Negativity Bias Theory argues that conservatives have more sensitivity to negative emotion.

These two theories do not directly compete; in fact, there appears much common ground between them, including considerable cross-citation. At their core, however, I believe they are studying different psychological mechanisms and potentially ought to have different predictions about the physiology of political ideology. I will argue below that avoidance sensitivity and negativity bias are different processes, and they need to be studied as such, with a kind of precision that is available to us from other disciplines. In this research program of the psychological and biological

determinants of political ideology, it is time for researchers to be more precise with how specific psychological mechanisms may, or may not, be related to political beliefs.

This dissertation takes up that charge by employing Jeffrey Allen Gray's theories (1972, 1981) on behavioral motivation, which have direct connection to both avoidance sensitivity and negativity bias. J.A. Gray hypothesized that animals have two complementary systems that underlie cognition, affect, and behavior. The behavioral activation system (BAS) facilitates behavior towards the completion of an objective or goal. We use this system hundreds of times a day; from reaching for a cup of coffee, to opening a doorknob, to speaking with a friend. The behavioral inhibition system (BIS) halts ongoing behavior in response to the introduction of novel information. This is a surveillance system, helping us react to unexpected changes in the environment. For example, we may be in the process of drinking coffee when we see a dead fly floating at the top of the cup. Seeing the fly cues a disgust reaction, and we halt our planned action to drink a sip of coffee. Introducing Gray's theories to the study of political ideology will help specify and articulate the mechanisms underneath both of the established theories.

Establishing the place of this project within the larger literature of political science and political psychology requires several steps. First, we engage the current political science literature on political ideology, including the history, relevance, and structure of political ideology in the literature. Second, we move into the current state of the psychological and physiological findings on political ideology, including an

investigation into the two major theories in the literature—the Motivated Social Cognition theory and the Negativity Bias Theory. Third, we discuss the political implications of Gray’s behavioral motivation systems, and how it intersects with the current political psychology theories of political ideology.

### **Political Ideology: History and Present**

Political attitudes are ubiquitous, and they have created the sociopolitical world around us. Political communities are characterized by sharp disagreement on societal rules, values, and expectations. These differences in opinion occur within regional areas, within small communities, within social groups, within economic classes, and even within families. Larger, more heterogeneous populations have larger differences in opinion. Even in small political communities, where shared backgrounds and mutual experiences yield a fairly common way of life, political disagreements can be surprisingly divisive. Sometimes, the family unit is the most heated battleground! Perhaps this is due to the paradox of it all—a unit of people that have so much shared environment are expected to have a common politics. When they do not, it is puzzling.

Why do human beings have so many central disagreements over how a society should be structured? No doubt the incredible variety of human experience would yield an incredible variety of political opinions. However, interestingly, for all the diversity of human experience and political attitudes, political disagreements tend to actualize as a general debate between only two opposing camps. One side largely values traditions, existing institutions, communities and families over government, and promotes safety,

economic freedoms, and economic inequality. This perspective has been labeled the "right-wing" perspective. The other side—the left-wing—largely values government as a corrective tool to balance unequal starts and protect disadvantaged groups, while promoting privacy at home and in religion.

In the United States and other places, the right-wing approach is called conservative and the left-wing approach liberal, and these perspectives emphatically disagree over the core values, policies, and politics that a society should embrace. There are some political issues that have no disagreement between liberals and conservatives; these valence issues can be important to partisan politics (Stokes 1963, Green 2007). But while we all agree that decreased crime and increased economic growth are good, it is puzzling and intriguing that we find ourselves mostly divided into two opposing camps, who frequently have orthogonal opinions on a variety of public policies. Partisanship, elite opinion leadership, and media all contribute to the polarization of our politics. But there is an important role for the individual self, which is our central concern here. Explaining why people have political disagreements requires an understanding of political ideologies, the term political scientists use to refer to belief structures of political attitudes.

### **Approaches to Studying Political Ideology in Political Science**

Political scientists have a number of approaches they have used to examine the nature and origins of political ideology. Traditional researchers have focused on environmental factors as the chief agents for explaining political behavior. They have

made tremendously important contributions. Political behaviorists have sought the origins of political attitudes in socioeconomic classes, racial groups, ethnic groups, religious affiliations, social groups, work socialization, family socialization, cultural environment, elite influences, and particularized historical contexts. This work on political attitudes has been dominant in the contemporary study of political behavior.

More recently, political science has had an explosion of research into the psychological, physiological, and biological factors in the formation of political attitudes. These researchers have looked at correlations between political values and genes, physiology, and the brain. “Over the last three decades, we have witnessed the emergence of neurological, biological, endocrinological, and physiological paradigms for the study of human behavioral differences” (Hatemi and McDermott 2011, 1).

Political science has taken enormous strides in the past decades towards a better understanding of political behavior. From the sociological studies of Lazarsfeld and colleagues (1944), to the social psychological school of Campbell and colleagues (1960), to Downsian economic voting and rational choice (1957), and even to newer theories of political attitude formation such as Zaller (1990), political science has a long and distinguished literature for explaining how people act politically. Interdisciplinary insights have fueled each of these forward movements, and it is no accident. Political scientists have often benefited from borrowing heavily from the methodological techniques of other disciplines, and the four seminal works above are perfect examples of this trend. Lazarsfeld was writing from a sociologist’s point of view and used a

sociological framework to analyze political behavior; Campbell and his colleagues borrowed survey methodology and attitude theories from social psychology; Downs was a young economist applying market principles to voting behavior; and Zaller borrowed theories and understandings from cognitive and social psychology in attitude formation and applied it to questions about survey answers.

Outside of these trailblazing political behavior researchers, the discipline as a whole has frequently reached out and incorporated other fields of study. Political scientists reach out to philosophy, ethics, and history as quickly as it reaches out to economics, psychology, and—increasingly—biology. In the next section, we explore in detail how political ideology has been studied in political science in the past.

### **Origins and Definitions of Ideology**

Political ideology has long been a topic of interest to political scientists, and it holds a unique position in political science scholarship. Political science has been generally characterized as a "borrower" discipline (Rigney and Barnes 1980; Miller 1997; Amadae and Bueno de Mesquita 1999; Pieters and Baumgartner 2002; Bartels and Brady 2003; Knight 2006; Sigelman and Goldfarb 2008, 2012). However, ideology is one of the few constructs widely studied in contemporary political science to originate directly within political science itself (Knight 2006, 619). In her study of the history of ideology in political science literature, Knight (2006) reports that the term "ideology" has grown substantially over time, and it now occupies a central role in research. During the first decade of the *American Political Science Review*, only 2.6 percent of articles



included "ideology" or a variant (620). By 1976, 50 percent of articles published in the APSR included the term ideology, and the percentage remained high into the 2000s (620).

Specific definitions of political ideology vary widely, but political science has worked with a few core definitions over the years. The original usage of ideology in politics was as slander against intellectual and political opponents in the 19th Century, used by figures such as Napoleon and Marx against opponents whom they saw as being dogmatically unreasonable and biased against their own views about government and political economy (620). Ideology at this time was synonymous with bias and false-consciousness. This "blinding worldview" usage of ideology is characterized by the idea that an ideological person has a worldview permeating their ideas and that worldview insidiously causes them to be unable to see alternative or contrasting viewpoints. Early political scientists also used ideology in the "blinding worldview" sense in our journals (albeit with much less fiery rhetoric than a political speech by Napoleon or Marx). It is important to note, though, that prior to 1930, the use of "ideology" in political science literature is overall quite scarce (620). It is unsurprising that a term used by political revolutionaries to score political points and brand opponents was not used frequently by more restrained political scientists, but it also demonstrates that political scientists had not yet come to understand how ideology could be a tool for understanding belief structures in the mass public.

World War II increased attention to the study of ideologies, as communism, fascism, socialism, and Marxism became hotly studied topics in political science literature (Knight 2006, 621). Ideology during this period continued to be defined as a collection of interrelated beliefs or a worldview. As before, the "blinding worldview" was employed against opposing viewpoints in a slanderous way, boldly painting opponents as biased or close-minded. It is during this period, however, that ideology as "blinding worldview" began to give way to a new usage of "worldview system," dropping the insulting or accusatory tone. By "worldview system," I mean that political scientists began to recognize that structures of interconnected values and attitudes existed in states and individuals, and these worldview structures did not automatically suggest a bias. For example, our literature began to understand that the much-praised liberal democracy was itself an ideology. A political scientist writing in 1942, for example, approvingly called the Monroe Doctrine an "ideological fence against fascism" (Wilcox 1942). So, we have two different usages of ideology being used side-by-side in the World War 2 period: the "blinding worldview" and the "worldview system." I want to note in passing that both usages are still wreathed in the idea of conflict between world-views. Also, again, it is worth mentioning that "ideology" was still a relatively uncommon subject in political science literature through the 1930s and into the 1940s (Knight 2006, 619-620).

Ideology continued to evolve through the 1940s and beyond, gaining new relevance in the midst of all the "-isms" of the post-war era. The rise of "-isms" as a

powerful force in the global political environment gave rise to the use of ideology in political science literature. Knight notes that 70 percent of articles mentioning ideology between 1947-1956 also mentioned communism or Marxism (2006, 621). Ideology continued to be connected to "-isms" into the McCarthyism Cold War era and beyond, but we can notice that political science's positivist turn seemed to have contributed to the abandonment of the "blinding worldview" usage in favor of the "worldview system" usage (the negative connotation of "ideology" remained, however, and remains to this day—but instead of a blatant accusation, it had been reduced to a connotation at worst). For one example of the "worldview system" usage gaining prominence, we can observe that Samuel Huntington, writing in 1957, defined ideology as "a system of ideas concerned with the distribution of political and social values and acquiesced in by a significant social group"—a clean, clinical definition of what was once used in uproarious, accusatory political speeches a hundred years prior. Knight notes this transition: "although the coherent and relatively stable set of beliefs or values has remained constant in political science over time, the connotations associated with the concept have undergone transformation" (625).

Even in this later era, however, the new and more neutral usage of ideology as "worldview system" still had a broad, complex, and sometimes contradictory usage within the discipline (Gerring 1997). There was confusion as to the proper level of study for ideology; it could be variably applied to states, governments, institutions, groups, or the individual (Minar 1961). Minar, writing in 1961, summarized the then-current usage

of ideology as "particularly vulnerable to vagueness and overgeneralization," but nonetheless noted with admiration that "the complete study of ideology is perhaps necessarily eclectic as to level and technique, as the best in the traditions of the discipline of political science has tended to be" (331). Interestingly, Minar's review of ideology appears to have predicted Converse's later work on ideology: Minar illustrates the importance of using psychological methodology to study ideology (329) and suggests that the difficulty of understanding ideology "perhaps be avoided when hypotheses are developed at a 'finer' level, i.e. when analysis proceeds on an individual psychological basis" (329). Minar directly influences Converse's groundbreaking study (and, highlights once again the "borrower" nature of political science).

It was in the 1960s that political science began to more narrowly and consistently define ideology as a value-neutral theoretical construct. The discipline's contemporary use and conception of political ideology begins with Phillip Converse (2006[1964]). Converse himself initially avoided using the term "ideology" because it was "thoroughly muddled," preferring the term "belief structures" in order to narrow down one particular facet of ideology he believed especially worthwhile for study (3). In essence, he was trying to separate out two terminological uses of ideology in order to focus on a third use, ideology as a belief structure. In other words, he was culling the blinding worldview and worldview system usage. Knight remarks "it is important to see Converse's contribution in the context of the times. By proposing that ideology was reflected in the representation of preferences on a liberal-conservative continuum, the

spatial definition removed the negative implications of bias or false consciousness" (2006, 623). "Belief structure" continues to be used in political science to this day, but as Converse explains, the "obvious overlap" between belief structures and ideology are apparent and hard to separate functionally (3). In contemporary research, when political scientists speak of ideology they are nearly always speaking of a kind of belief structure, and consequently, terminology has converged (see Knight 2006). It converged for Converse, too; even as he was trying to avoid the muddled usage of ideology, he still used the term interchangeably with belief structure (2006[1964], 3). In the very same article that Converse shies away from using the term ideology, he nonetheless finds himself using it again. He writes that "belief systems that have relatively wide ranges...are broadly called ideologies and we shall use the term for aesthetic relief where it seems most appropriate" (2006[1964], 5).

Seemingly following Minar's suggestions, Converse proposed what Gerring (1997) and Knight (2006) have called the core definition of ideology: ideology as coherence and issue constraint. The field followed Converse on this choice. Gerring writes, "if all the senses of the term ideology are attended to, I would argue that only one trait meets [the criterion of universality]. The importance of coherence—aka 'consistency' or 'constraint'—is virtually unchallenged in the social science literature" (1997, 980). Knight writes in agreement, "this consensus is reflected in the 'core definition' of coherence, regardless of what other conceptual baggage might be imposed on the concept, the notion of ideology remains a relatively stable set of

interrelated ideas" (2006, 623). Knight also mentions the connection between ideology and conflict: "beyond this, the crucial element of contrast—the notion that one set of beliefs competes against another—is implicit in discussion of party ideologies, 'ists,' and 'isms'" (623).

For Converse, the central defining element of political ideology is the idea of coherence, which is operationalized as issue constraint. For the collection of attitudes to have an underlying structure (a "belief system" or an "ideology"), outsiders who are given one attitude as a starting point should be able to predict additional attitudes held by the ideological individual. Holding one attitude should constrain what other attitudes that person may hold, if they have an ideological structure to their political attitudes. The collection of attitudes that a person could hold would be interrelated along ideological lines. In contrast, holding a random collection of attitudes without any consistency or restraint between them is non-ideological—there is no structure to the belief system. Knight (2006) identifies this as the core definition of ideology (despite widely varying usage from the 1800s until today) and she also offers that this definition is the most popularly used conception in political science since the 1960s due to Converse's influence on the issue. Converse's work on defining ideology has been tremendously influential in political science, but also in other social sciences (Kinder 2006, Bennet 2006, Jost 2006).

From Converse, political scientists inherited a definition of ideology that they (and other social scientists) could use to help understand belief structures in the mass

public. As noted above, over 50 percent of articles in the flagship journal of political science make a mention of the word ideology from the 1970s into the 2000s (Knight 2006, 620), demonstrating the importance and utility of the Conversian understanding of ideology for political scientists both past and present, with no signs of slowing down in the future.

### **Structure of Ideology: Left and Right**

Having outlined the origins of political ideology in political science, we move now to an examination of the structure of ideology today. The divide between the political right and the left is a surprisingly timeless paradigm for politics. From the Spartans and Athenians in ancient Greece to the French Revolution and beyond, politically interested human beings in the past and present have found themselves divided on questions of tradition versus change, security versus freedom, and hierarchy versus individualism. Human beings will continue to have these conflicts of vision no matter which planet we find ourselves inhabiting.

One part of what makes the left-right division in politics so striking is its ubiquity. The left-right construct is not only useful to social scientists for describing political behavior—it is also a heuristic that is popularly used by the public. Political scientists have often thought of ideology as a continuum, and we have used spatial ideological modeling to great effect in describing political agents like legislatures (Poole and Rosenthal 2001, Poole 2005), presidents (Treier 2010) and courts (Martin and Quinn 2002). And, even in popular media, one can hear frequent use of spatial concepts for organizing political

groups. Presidential candidates appeal to the “wings” of their party (the more radical party members figuratively spread out from the center) during the primary election. Once selected by their party, they appeal to “the middle” towards moderate voters. In the 2012 presidential election, Republican Rick Santorum was tied to the “Far-Right” for his political beliefs on abortion, while Democrat Barack Obama was labeled by political opponents as a member of the “Far-Left” because of his universal health care plan. Republican Mitt Romney’s primary campaign in 2012 was described as a way to “move to the right” to appeal to more radical conservatives who were skeptical of Romney’s politically moderate tenure as governor of Massachusetts. Democratic-leaning independent Bernie Sanders was originally a “far-left” protest candidate of Democratic centrist Hillary Clinton’s 2016 presidential campaign. Politically sophisticated American citizens and media use these terms in everyday discussions. As Jost (2006) writes, “even casual observers of today’s headlines, newscasts, and late night talk shows cannot escape the feeling that ideology is everywhere” (Jost 2006, 652). A Google web search in May 2016 reveals over 185 million results for “liberal,” 137 million results for “conservative,” and 49.3 million results for “ideology.”

What does it mean to be left or right in the United States? Ellis and Stimson provide excellent summaries of the popular conception of the two political ideologies in *Ideology in America* (2011). In the United States and in some other places, liberal is associated with leftist politics, while conservative is associated with rightist politics. To be liberal in the United States means you embrace the idea of equality of opportunity



for all, and you see government as the primary tool for balancing out unequal starts (Ellis and Stimson 2011, 3). Liberals believe that a market economy provides benefits to society, but that it has dangerous outcomes to disadvantaged groups, thus requiring government to be a firm regulator (4). The role of government is also to establish standards for the social order, in markets and for public goods (4). Liberals embrace freedom for private, non-economic choices in lifestyle and religion, with religion considered to be outside the proper scope of government. To be conservative in the United States means that you believe that families and communities are the driving forces of society, not government (5). Government often lacks the moral imperative and practical feasibility to correct market failures and address other economic considerations (5). The free market may have issues, but government is ill-equipped to make adjustments, often making problems worse instead of correcting them (6). Conservatives support economic freedoms and income inequality, believing that both of these tend to lead towards a greater economic prosperity for society over time (5). Government should be limited, but they do have responsibility for providing safe and effective market transactions, as well as help enforce property rights and private contracts (5). In terms of private social behavior, conservatives tend to split into two camps. One group favors a strong government for promoting traditional values, enforcing order in society, and preserving the role of religion in public life (6). A different group is more libertarian in outlook, and they instead desire freedom in social affairs in parallel with freedoms in economic life (6).

Psychologist John Jost has studied political ideology from a social psychologist perspective, focusing on the psychological factors that may motivate conservative beliefs. Jost and colleagues have determined two primary factors divide liberals and conservatives most fundamentally: (a) advocating versus resisting social change (as opposed to tradition) and (b) rejecting versus accepting inequality (Jost et al. 2003, Jost 2006, Jost and Amodio 2012).

While other systems have made interesting contributions to the study of political belief structures and ideology (for example, the Moral Foundations Theory of Haidt and Graham 2007, Graham et al. 2009, Haidt et al. 2009 and the Cultural Cognition Theory of Gastil et al. 2011), none of them outright reject the basic liberal versus conservative pattern. Generally speaking, the liberal versus conservative dichotomy is preserved quite well in new systems, although most conceptualize liberal and conservative differences in a multidimensional framework instead of one-dimensional. For example, a common multidimensional model of political ideology divides social issues from economic issues. Even with two dimensions, one can see the liberal versus conservative conflict. Social liberals conflict with social conservatives alongside economic liberals and economic conservatives. We can increase specificity of ideology with new systems, but the left-right divide remains surprisingly intact. Overall, I believe the ubiquitous left-right divide occupies a central place in the study of political behavior for political scientists, and it serves as good common-ground for political scientists and psychologists

to meet. However, we do need to take seriously the consequences of multiple dimensions of political ideology. We take up this conversation in the next section.

### **Dimensions of Political Ideology**

Typically, political scientists and researchers in related fields have argued for a simple one-dimensional scale of general liberalism versus conservatism. Researchers have articulated ideology as a one-dimensional construct (Knight 1999, 2006; Jost et al. 2009). This scale has served the research literature generally well over time, and it holds much predictive power (Knight 1999; 2006; Jost et al. 2009). The most popular scale of measuring political ideology is self-identification on a seven point Likert scale (see, for example, the time-honored American National Election Studies). In this scale, individuals are asked to place themselves on a seven point, fully labeled scale from “Very liberal” to “Very conservative,” with the midpoint of four labeled “moderate.” However, political scientists focused on the measurement of ideology in the mass public have often found ideology to be more complex than this simple scale, requiring two new understandings. First, ideological appears multidimensional, and the dimensions are most likely economic policy and social policy. Second, there appear to be differences in how ideology manifests in elites versus the mass public.

Political elites fit the one-dimensional scale well, given their strong attitudes and their well-sorted party identification (Kritzer 1978; Jennings 1992; Fiorina et al. 2005; Abramowitz and Saunders 2008; Lewis-Beck et al. 2008). Additionally, the Conersionian definition of ideology as attitudinal constraint seems to work well for political elites

(Kritzer 1978, Jennings 1992, Lewis-Beck et al. 2008). However, even for political elites, we have some cause to question what the scale is actually measuring (see, for example, Conover and Feldman 1981). It is plausible that the one-dimensional scale is descriptive of whatever current, ongoing elite ideological conflict is happening, rather than a stable grouping of values. If true, conservatism on the scale may not be defined by underlying or abstract conservative values, but instead by whatever self-described conservative elites have packaged together. The debate over same-sex marriage in 2013 within the Republican party is an example of elites trying to redefine what conservatism is, rather than trying to define their position against a static benchmark for what conservatism means (see Socarides 2013).

The validity of measuring the ideology of the mass public on a one-dimensional scale has generated a lengthy discussion in the political science literature, as numerous researchers both past and present have argued that the one-dimensional model is underspecified, simplistic, or simply empirically absent from the mass public (Stimson 1975, Conover and Feldman 1981; Kerlinger 1984; Peffley and Hurwitz 1985; Page and Shapiro 1992; Jacoby 1995; Kinder 1998; Stimson 2004; Jacoby 2009; Haidt et al. 2009; Treier and Hillygus 2009; Ellis and Stimson 2009, 2012; Popp and Rudolph 2011; Carmines et al. 2012, Hussey 2012). Measuring ideology in the mass public has been of tremendous interest in the political science literature. The first argument about the nature of belief systems in the mass public claims that the public is mostly non-

ideological (Converse 2006 [1964]); consequently, both one-dimensional and multidimensional conceptions are equally ill-suited to describing the public.

A secondary argument, however, posits that the mass public is multidimensional in its belief structures (Treier and Hillygus 2009; Hussey 2012; Carmines et al. 2012), and the mismatch between elites (who are one-dimensional) and the mass public (who are multidimensional) creates problems for measuring belief structures in the mass public. These studies note the special challenges of being a cross-pressured voter in a political environment where elites are one-dimensional. A voter who is liberal on one dimension (e.g. social issues) and conservative on the other dimension (e.g. economic issues) becomes underrepresented by elites, leading to lower political participation (Hussey 2012; Carmines et al. 2012) as well as confusion about their place on a one-dimensional ideology scale (Treier and Hillygus 2009; Hussey 2012).

Here is an example of that potential confusion. Libertarian voters (socially liberal but economically conservative) have trouble answering our ideological placement questions. When asked by the American National Election Studies to place themselves on a one-dimensional scale of liberalism-conservatism, libertarians are conflicted. Do they circle the middle reflecting the sum of their diverse attitudes? This is problematic for researcher interpretation because self-placement in the middle could also imply they are apathetic, moderate, or that they do not understand what the labels mean. But in this case, none of those possible explanations are true. These libertarian voters are both politically interested and fairly radical in their beliefs; they did not know how to

place themselves because the scale simple does not fit their belief structure. There are other problems, too. Libertarians who routinely vote Republican may self-place themselves on the conservative side of the spectrum, misinterpreting that the surveyor is asking them about partisanship or perhaps identifying as conservative because the label is politically charged at the moment (think of the Tea Party movement).

The conclusion from this line of research suggests that a multidimensional scale will reduce measurement error. If the mass public is ideological at all, that is. We pick up this topic in the next section.

Why does the dimensionality of political ideology matter for the current research project? First, virtually all of the political psychology literature on the connection between ideology and various psychological factors measure ideology on a one-dimensional scale. Political science literature suggests, however, that using a one-dimensional scale may not fit the public very well, presenting the possibility that most work on this subject could be improved by introducing multidimensionality to their measures. Second, having difficulty capturing the mass public on a one-dimensional scale has traditionally been interpreted as evidence that the public is non-ideological, as most scholars conclude based on the Conersian tradition. This could be incorrect, however. If the public were actually multidimensional in their political ideology, trying to fit them on a single dimension would similarly fail. Moving forward, to study ideology properly requires social scientists to include multidimensionality.

### **Political Ideology in the Mass Public**

Does the mass public even think about politics in ideological terms or understand what political ideology is? If political ideology is having a relatively stable and logically coherent belief system, few people meet that standard, according to Converse (2006 [1964]). Using American National Election Study data from 1956 to evaluate the public's view, Converse estimates that only about 12 percent of the electorate uses ideological thinking to organize their political beliefs, based on the attitudinal constraint definition of ideology.

Converse finds that only a small fraction of the mass public organizes their political beliefs according to broad and abstract principles. So, then, how do they organize their beliefs, if at all? Converse grouped survey responses into five categories of attitude structures: ideologue, near-ideologue, group interests, nature of the times, and no issue content. Ideologues are people who exhibit some evidence of ideological thinking, by articulating abstract principles and using conceptual dimensions to evaluate political actors. Near ideologues are those who used ideological thinking in a brief or incomplete way, yet did make at least a minimal appeal to abstract principles. Group interests were people who did not use ideological precepts and instead made evaluations based on the favorable or unfavorable treatment of groups in society (working against "the common man," favoring "big business"). Nature of the times describes people who praised or blamed political actors based on the actors' association with either good times or bad times in the recent past. Finally, there is a residual

category for respondents who had virtually no structure to their political attitudes and were unable to articulate an organization for their beliefs at all.

This data is from one study in the 1960s and no matter how incredibly influential this piece is, we ought to look at more data. Lewis-Beck et al. (2008) closely followed Converse's methodology on attitude structures and updated observations about the mass public using 2000 and 2004 American National Election Studies data. The number of people who are ideologues and near-ideologues had increased from 11.5 percent to 19.8 percent of the population since Converse published his research in 1964. 20 percent of the population is twice what Converse found, although it still remains a minority of the mass public.

Political scientists disagree over these claims, however. Political scientists have tended to agree that political elites are polarized around ideology and partisanship. Political elites are broadly defined as people with high levels of political knowledge, political interest, and political participation (sometimes this group is also called political sophisticates or the political class). High levels of political engagement and political sophistication characterize them, and they also have strong, durable political beliefs (Abramowitz 2010; Claassen and Highton 2009; Levendusky 2009). Political elites can include elected government officials, but it can also refer to private citizens with an intense interest in political affairs. Political scientists are in agreement that political elites are polarized along the Left-Right continuum, and they have grown more ideologically polarized over time. The theme of elite polarization on a liberal-



conservative continuum is a major one in current political behavior studies (Hetherington 2001; Fiorina et al. 2005; Lewis-Beck et al. 2008; Abramowitz and Saunders 2008; Fiorina and Abrams 2008).

While political scientists agree about elites, they have an ongoing (and passionate) debate about political polarization in the mass public. A popular and influential book by Morris Fiorina (*Culture War?*, 2005) argues that while elite polarization is dangerously increasing over time, everyday citizens themselves have virtually no ideological polarization. In Fiorina's analysis, he demonstrates relatively small differences in opinion between red states and blue states (49), as well as only mild differences in opinion between self-placed Republicans and Democrats on contemporary political issues (65). Claassen and Highton (2009) find support for Fiorina, and they suggest that party elite polarization has been increasing and that the public still continues to be unmotivated to become politically aware. RePass joins in this debate on the side of Fiorina, demonstrating in his analysis that only 7.4 percent of potential voters in the United States were found to be both strongly conservative and strongly Republican, while only 3.2 percent were both strongly liberal and strongly Democratic (2008). RePass also reports that 62.4 percent of the American public is functionally non-ideological, meaning they do not adhere to abstract ideological principles on either the left or the right (2008). This line of argument tends to lead towards Convisian conclusions about the mass public—regular people simply are not animated by ideological principles. Fiorina's work describes a mass public that is

distinctly moderate and characterized by rather strong agreement about the issues (instead of being locked in ideological conflict).

Abramowitz and Saunders (2008) disagree intensely with Fiorina, arguing that a substantially large segment of the mass public is ideological and growing more ideological over time. Abramowitz and Saunders find little evidence of polarization in the least politically engaged third of the public (agreeing with Fiorina here) but they find that most engaged third is significantly polarized (2008, 546). Moreover, they also argue that polarization actually has some benefits for increasing political interest and participation, by energizing voters and increasing political participation. This debate between the Fiorina camp and the Abramowitz camp continues to this day to be fairly spirited, inspiring new research (Fiorina et al. 2008; Abramowitz 2010). These scholars all agree that political elites are sharply polarized, and have grown more polarized over time. They disagree over the ideological polarization of the mass public.

Arguments over the polarization the public may give us suggestions about whether the public's attitude structures are ideological in nature, but it does not fully satisfy the basic Converse project of exploring whether the mass public adheres to ideological belief systems because political polarization does not require political ideology but could be dependent mostly on partisan identity (or even, as recently suggested by Iyengar and colleagues, by emotional affect (Iyengar et al. 2012); see also Huddy et al. 2015). The most direct evidence we have, therefore, is from the studies of Converse and followers (Lewis-Beck et al. 2008; see also McGuire 1986; Tedin, 1987). In

his original work, Converse demonstrated that few in the mass public thought about politics in terms of ideology, but there has been a strong growth of ideological thinkers in more recent time, according to Lewis-Beck and colleagues (who have deliberately replicated Converse's methodology as closely as possible). Overall, it seems that political scientists mostly agree that the number of people in the mass public who *fully* structure their political attitudes according to ideological principles is small but perhaps growing. Political science is not the only social science to look at political ideology, however, and we will see that political psychologists and social psychologists have interesting insights that political scientists have overlooked.

In a 2006 retrospective on his work, Converse eagerly commented on the view born from his work that citizens mostly have nonattitudes and/or are non-ideological (Converse 2006). Converse quickly addresses the issue as a strawman argument of the worst kind. He states, "to my eye, the worst common misinterpretation of the essay attributes to me the claim that most citizens have only "nonattitudes" on questions of public policy. It is my contention, I am told, that "real" policy opinions are in very short supply" (300). In his own words, he states a viewpoint that the public has many ideological beliefs, with only 22 percent of his original sample have completely non-political viewpoints (301). He says, "In short, I have found it very hard to understand this misreading about few in the electorate holding any "real" policy attitudes. It is almost as though the misreader believes our argument to be that citizens must be either full ideologues or near to it (12 percent of the electorate) or else that they have no

"real" policy attitudes. This is quite unimaginable to me" (303). Converse himself believes that "full ideologue" is perhaps a very tall bar to leap for the mass public, and a failure to hit that threshold does not indicate that people are completely nonideological.

Indeed, is it possible that these scholars have simply "defined away" ideology by making its requirements too steep? (Jost 2006, 653). Converse had a tremendous impact on psychologists studying political ideology, effectively closing down the study of political ideology (651). "The deadening impact of these conclusions on the study of ideology in social, personality, and political psychology can scarcely be exaggerated" (Jost 2006, 651-652). Jost criticizes the entire group of ideology scholars for having a standard for ideological thinking that was too strict, with too many prerequisites (650-652).

Following Tedin 1987, Jost proposes the definition of political ideology is better thought of as an interrelated set of moral and political attitudes possessing cognitive, affective, and motivational components (Jost 2006, 653). This standard, more flexible and broader than Converse's, "gives ordinary citizens a reasonable chance of empirically satisfying the criteria of being ideological" (654) and allows Jost to issue a call for psychologists and political scientists to reopen the study of political ideology. Jost points us to Kerlinger (1984) who writes as if to summarize this point:

Whether conservatism and liberalism are typically conceptual tools for the man-in-the-street is not the central point. For the scientist, too, liberalism and conservatism are abstractions like any other abstract concepts he works with: introversion, intelligence, radicalism, achievement, political development and the like. To be sure, most people don't recognize their abstract nature and certainly don't use them

as social scientists do. Nevertheless, they are quite familiar with their behavioral and environmental manifestations. (217)

Political scientists have been primarily concerned with the question of whether elites and the public organize their politics around ideological principles and how consistent they are in the expression of those principles—thus emphasizing defining and measuring ideology instead of explaining why individuals, groups, or societies gravitate towards ideological persuasions (Jost 2006, 654). The insight of Jost and Kerlinger is that human beings do not have to intellectually understand ideological thinking in order to be found using it. When looking at the most influential work from political scientists on this question, Jost's charge seems fair—Converse and his followers have frequently defined ideological thinking in terms of whether citizens can explain what ideology is, whether they can accurately frame their opinions in ideological terms, and whether they can accurately place political actors on a political ideology continuum. These are important questions worthy of continued analysis. However, just because people do not understand political ideology does not mean they are not ideological. Moreover, as Sullivan and colleagues taught us about the mass public and ideology, people are highly sensitive to the method of measurement employed (Sullivan et al. 1978). Ask questions as Converse did, and the public largely looks non-ideological. However, change the questions as Nie and colleagues did (Nie and Anderson, 1974; Nie et al. 1976), and ideology in the mass public swells to much higher rates. In this respect, ideology is similar to religious belief—it is difficult to parse out, but there is little doubt that

religiosity varies widely among the population and can be a driving force in some people's lives.

Jost (2006) marshals some empirical support for the claim that the mass public is more ideological today than in the quieter 1950s-60s when Converse was collecting his data. First, note that Stimson (1975) argued that more than a majority of the actual electorate had evidence of an ideological belief structure according to Converse's definition (414). Second, Judd and Milburn (1980) analyzed data from the 1970s and found it to "pose a substantial threat to Converse's original hypothesis that the attitude responses of the public at large are unstable, nearly random responses" (82). In an analysis of ANES data conducted by Jost, he finds that over two-thirds of respondents since 1972, and over three-fourths since 1996 were willing to place themselves on a scale of liberalism-conservatism, even when provided explicit "don't know" answer item options. Overall, self-placement on the scales are reasonably accurate (Conover & Feldman, 1981; Evans, Heath, & Lalljee, 1996; Feldman, 2003; Knight, 1999). Additionally, the scale has tremendously strong predictive usefulness, explaining 85% of the variance in presidential vote choice (Jost 2006, 658).

Some political scientists have joined this chorus as well. In their book *Predisposed*, authors Hibbing, Smith, and Alford write: "Ideology is not, as Converse and his many followers claimed, merely the ability to describe currently popular labels or to endorse collections of positions that meet with the approval of political scientists" (2014, 56). Like Jost, they argue that ideological thinking is a core part of human nature:

“Ideology is us” (56). Ideological thinking is due to bedrock social and political problems that draw roots from our evolutionary heritage. “The [political] division is real and unavoidable, and it centers on distinct orientations to mass-scale social life...ideology...is not, as the ‘end of ideology’ school asserted, a concept that just popped out fresh and new from Renaissance thought, only to fade from sight with the end of the Cold War” (55-56).

Ellis and Stimson (2012) similarly reject Converseian claims about ideology, writing that “whatever the well-documented weaknesses and randomness of individual-level political opinions (see Converse 1964 for the still authoritative treatment), we expect to find power and simplicity when we look at the summary preferences of the whole electorate over time” (37). In their analysis, Ellis and Stimson find that large segments of the population that can be categorized into four ideological groups (operationally vs. symbolically, liberal vs. conservative). Ellis and Stimson easily concede that the voters may not be capable of articulating their own underlying belief structure, but the big picture of the data tells a clear story. For example, in their most recent year of data (2006) they find that 25% of the public is operationally liberal but symbolically conservative (Figure 5.5, 98). This “mismatched” ideological specification would have failed Converse’s test, effectively labeling a quarter of the population non-ideological under his terms. But, in reality, this group has a consistent set of professed values (typically conservative) and also a consistent design for how they want government to function (typically liberal). It is not a contradiction or a confusion. They are church-

going, gun-owning patriots who support minimum wage and believe it is the role of government to provide housing for the poor (Table 5.5, 105). They may be *conflicted* conservatives (Ellis and Stimson 2012, 111) but they are consistently so in their attitudes about social life and government prerogatives.

Jost, Hibbing, and other political psychologists propose that ideological thinking plays a critical role in social cognition—the way human beings encode, store, process, and retrieve social information. Studies from these researchers reveal meaningful political and psychological differences between liberals and conservatives that co-vary with dispositional and situational variables. Political ideology is tied more deeply into the human experience than we may have realized, and this area deserves more attention from political scientists.

Next, we turn to new research in political science and political psychology that explores the psychological and physiological correlations to political ideology. Two large theories have emerged to describe the underlying mechanical structures of a host of various studies on the psychological and physiological traits of political adherents. We outline these two theories and point to an area of the literature that needs better specification in order for us to understand how liberals and conservatives differ from each other in their traits and dispositions.

### **New Approaches to the Study of Political Attitudes**

The study of biological origins of politics could be considered to have started shortly after the discipline itself was founded (Aristotle's famous "man is a political



animal"). In the modern state of the discipline, E.O. Wilson's writings on sociobiology (Wilson 1979) kickstarted an intense debate over biological determinism that appears to have resulted in a cooling of the entire research program. More recently, renewed interest from political scientists and psychologists have reinvigorated the field of study. They have faced less criticism from other academics compared to the earlier generation, perhaps partially because of increased scientific literacy across fields, or perhaps due to increasing tolerance for other methodologies, or perhaps partially because of a concerted effort by these new wave biopolitical scientists to express the unification of nature and nurture, instead of being ambivalent or depicting them as opposing forces. Very recently, scholars have begun to connect some of the dots between political science and biology by calling for a new look at the evolutionary origins of politics (Hatemi and McDermott 2011).

What is "biopolitics" as a subfield of political behavior? Somit and Peterson define biopolitics as a "short-hand term used to describe the approach of those in the profession who believe that biological concepts—especially evolutionary theory, which treats behaviour as the product of both nature and nurture—and biological research techniques can help us study and understand political behaviour better" (1999, 559). Alford and Hibbing write "a biological approach to political science is hardly new... in fact, biopolitics stretches back nearly as far as behavioral politics; both approaches found their first enthusiastic practitioners in the behavioral revolution of the 1960s" (2008, 184). The first review of the biopolitics literature was published in 1972,

summarizing the findings and theoretical underpinnings of forty articles (Somit 1972).

Biopolitics received formal disciplinary recognition in 1973 when the IPSA Research Committee on Biology and Politics was formed (560). The Association for Politics and Life Sciences was formed in 1981 and launched a dedicated journal, *Politics and the Life Sciences*, in 1983 (560). By 1998, Somit and Peterson note that the biopolitics literature had increased to over 1200 articles (1998, 560).

However, the state of biopolitics research in political science proper has always been questionable even as it was growing. Somit and Peterson note the vast majority of this literature was featured in journals outside of political science, and the top tier journals were largely abandoning the publishing of biopolitics work (1998, 561). Somit and Peterson (1999) express disappointment in the lack of biopolitics research in political science of that time, and they attribute this dearth of research to (a) losing shared theoretical space with rational choice, (b) residual distaste for ill-founded social Darwinism accusations and implications of racist associations with earlier biopolitics work, and (c) hesitation of new scholars to engage the work because of negative career implications. Alford and Hibbing note the departure in methodology between early behaviorists and early biopolitics researchers: behaviorists took an empirical approach where instead “biopolitics [had] remained largely theoretical, descriptive, and speculative” (Alford and Hibbing 2008, 184). Even the negative associations with social Darwinism aside, biopolitics appears to have stagnated because political science grew

increasingly interested in empirical study, and early biopolitics researchers did not share this interest, or had methodological difficulty.

This changed in the 2000s. A groundbreaking study by Alford et al. (2005) used twin data to reveal the surprising inheritability of political attitudes and party identification. Fowler and colleagues followed swiftly afterward with two studies demonstrating the heritability and genetics of political participation (Fowler et al. 2008; Fowler and Dawes 2008). These studies were published in top tier journals and were empirical in methodology. They opened a floodgate of empirical biopolitics work within the pages of political science's top journals (including, also, high-profile criticism; see Charney 2008; Charney and English 2012).

### **Why Biological Models?**

Political behavior researchers have traditionally used two approaches for explaining human action in politics—situational and individual (Hatemi and McDermott, 2011, 13). Socialization models exemplify the situational approach, positing that the environment creates, shapes, and reinforces the political behavior of the individual that ascends from that environment. The individual approach, in contrast, is exemplified by rational-choice modeling, which asserts that individual behavior responds to changing incentive payoff schedules. As Hatemi and McDermott note, "in their most reduced form, behavioral models argue that all behavior results from social conditioning (Campbell et al. 1960), while rational-choice models assume preferences are exogenous, fixed, and given, and remain agnostic, if not unconcerned, about their source (Bueno de

Mesquita 1983)" (Hatemi and McDermott, 2011, 13). Both of these perspectives are environmental in the sense that environmental changes drive all of the important effects in the models. Changing socioeconomic status or changing the payoffs for defecting is proposed to substantially change the behavior of subjects.

Models from both approaches have had a huge impact on the discipline of political science as a whole, and they continue to be productive lines of research that increase understanding and knowledge of political behavior. Over time, however, many other scientific disciplines challenged the assumptions of both socialization/behavioral models and rational-choice models (Green and Shapiro 1994; Robson and Kaplan 2003). Hatemi and McDermott note that "numerous challenges from economics, psychology, neuroscience, and other fields have found that not all people are socialized to act the same way; rational-choice models also hold limited explanatory capacity by remaining almost exclusively focused on choices motivated by unrealistically narrow conceptions of self-interest (Dawes and Thaler 1988; Tversky and Thaler 1990; Fehr and Gächter 2000; Gintis 2000; Henrich et al. 2001, Fehr and Fischbacher 2004)."

These environmental models necessarily are silent on the human being prior to interaction with the environment. This is not a fundamental flaw to the research program, but we no longer need to treat the pre-environment psychological/biological being as a black box to be ignored. We already intuitively understand that humans do not enter into the environment as blank slates. People within a common environment (say, a small community) can have rather divergent opinions on politics, or could have

very different preferences for monetary inducements. Race, gender, social class, and culture have powerful effects on political behavior, but within these subgroups is disagreement about political candidates and political issues. Even within families there is a surprising diversity of opinion—two siblings raised in the same household have an environment in common and yet regularly hold different political beliefs. The point here is that the environmental effects are not universal—every human reacts differently to every environmental effect. We are beginning to fashion the tools we need to start understanding why and how people are different prior to the important environmental effects.

Given our evolutionary history, purely economic models of human behavior seem dubious as explanations for the sum of human political behavior. "The process of natural selection is based upon adaptive traits beginning at a much earlier period in human development, where pure economic power-seeking and self-interest were not the only potential adaptive traits, if such traits were adaptive at all. Certainly many important human social and political traits, including detecting kin, selecting mates, foraging for food, avoiding predators, and detecting cheaters, evolved in a context prior to modern market conditions" (Hatemi and McDermott 2011, 13). We should not be surprised that it takes an exceptionally large monetary incentive to get human beings to defect from those who share close kinship, given how central such an impulse seems to be to our evolutionary psychology (Trivers 1971; Kruger 2003; Axelrod and Hamilton 2006). Economic models also seem to be unable to explain our tendency to want to

punish defectors even when it costs us personally to do so, and we expect to not recover the costs of punishment (Gintis 2003).

Biological models have the potential to contribute to the existing sociological and economic behavioral models in political science by offering a theoretical explanation for these behavioral effects that the other models consider paradoxes (Hatemi and McDermott 2011). But even more centrally, evolutionary political science offers to investigate a large paradox in the study of political behavior: "simply put, our current theories and examinations largely assume that all people are biologically the same when it comes to politics, which is a radical notion considering how remarkably diverse humans are in virtually every other domain" (Hatemi and McDermott 2011, 18).

With these insights in mind, calls for an ambitious program of political neuroscience began in the 2000s from a number of researchers connected closely to biopolitics in political science (Marcus et al. 1998, McDermott 2004, Schreiber 2006, Fowler and Schreiber 2008, McDermott 2009; Hatemi and McDermott 2011; Schreiber 2011) as well as in political psychology (Lieberman and Schreiber 2003, Cacioppo and Visser 2003, Amodio and Jost 2007, Jost and Amodio 2012). As we shall see in the next section, political neuroscience offers new methodological tools to study our core questions about political ideology. For the present study of political ideology, biological investigations promise to be revealing—political ideology is likely an evolutionary adaptation that human beings evolved in response to the social nature of human groups (Thornhill and Fincher, 2007; Hatemi and McDermott, 2011; Fincher et al. 2008).

## Two Psychological Theories Emerge

The recent reawakening of the biopolitics and political attitudes research program in political science has been coupled with a similar revival of interest in political ideology in social psychology. While there is a myriad of studies in the literature tying various psychological, physiological, neurological, and endocrinological factors to political attitudes, two overarching theories have emerged for explaining why these differences are there. First, the Motivated Social Cognition theory posits that differences in psychological factors (traits, dispositions, cognitive styles) suggest conservatives (compared to liberals) are more motivated by needs to reduce uncertainty, ambiguity, threat, and disgust (Jost et al. 2003). Second, the Negativity Bias Theory argues that conservatives have more sensitivity to negativity than liberals, causing them to register greater physiological responses to such stimuli and devote more psychological resources to them. Considerable cross-citation exists between the two theories and much common ground. Below, I outline the two theories and their findings. We are on the precipice of additional theoretical development (see, for example, unpublished work by Tritt et al. on the arousal model of political conservatism). However, the two major theories represent the most well-developed and empirically supported literature that we have today.

Having established a history of research on political ideology, the next chapter outlines a research program designed to improve our understanding of the two major theories of political ideology from a political psychology perspective. It also introduces

the work and ideas of Jeffrey Allen Gray, an influential psychologist who can help specify and clarify the psychological processes studied by the teams from Hibbing and Jost.



## CHAPTER THREE

### THEORY

This chapter builds the theoretical foundations for the empirical investigation in the remainder of the dissertation. The motivating question for this dissertation is as follows: do conservatives and liberals have differing sensitivities to avoidance, inhibition, and negative emotion? Do psychological factors beneath our conscious awareness underlie the political ideologies we embrace?

As reviewed in the last chapter, there are two major theories concerning the psychological differences between political liberals and conservatives. Psychologist John Jost and his colleagues formulated the Motivated Social Cognition Theory. This theory posits that conservatives are motivated by behavioral avoidance. In Jost's terminology, conservatives are more motivated by needs to reduce uncertainty, ambiguity, threat, and disgust (Jost et al. 2003), which is due to differences in dispositional traits (compared to liberals). The second theory, from John Hibbing and colleagues, posits that conservatives have more sensitivity to negative emotion. I term this the Negativity Bias Theory.

This chapter provides theoretical and literature justification for my characterization of these two theories. It is important to recognize that these two theories are not competing theories—I argue they are interested in different

psychological processes. Jost's work has an affinity with a psychological disposition called avoidance sensitivity, while Hibbing's work focuses instead on negative emotion. By the end of this chapter, we will see that Jeffrey Allen Gray's theories on behavioral motivation have a direct connection to both avoidance sensitivity and negativity bias. His theories, and the neuroscience related to them, can considerably aid the research program of understanding political ideology from a psychological perspective. Thus, the goal of this chapter is to articulate these two theories, integrate Gray's theoretical insights to this project, and explain why neuroscience methodology is essential to sorting all of this out.

### **The Negativity Bias Theory**

Hibbing, Smith, and Alford (2014) present the Negativity Bias Theory as a summation of a decade of research into the physiology of political ideology. These scholars have been the primary progenitors of the modern "rediscovery" of the biology and politics research program, a revival that begins in the mid 2000s. In summarizing the entire empirical biopolitics literature in political science, as well as drawing deeply from the political psychology literature, Hibbing and colleagues hypothesize that conservatives have a stronger negativity bias than liberals. Negativity bias means that "negative events are more salient, potent, dominant in combinations, and generally efficacious than positive events" (Rozin & Royzman 2001, 297).

Human beings, on average, tend to have negativity bias. People in general are more sensitive to negative faces, words, and social information, and biological systems

tend to have measurably higher levels of activation in response to negative than positive stimuli (Rozin & Royzman 2001). However, Hibbing and colleagues note that this sensitivity is measurably stronger in conservatives than liberals and this theory explains nearly all of the hundreds of political psychological studies of correlates to political attitudes.

Consequently, not only do political positions favoring defense spending, roadblocks to immigration, and harsh treatment of criminals seem naturally to mesh with heightened response to threatening stimuli but those fostering conforming unity (school children reciting the pledge of allegiance), traditional lifestyles (opposition to gay marriage), enforced personal responsibility (opposition to welfare programs and government provided healthcare), longstanding sources of authority (Biblical inerrancy; literal, unchanging interpretations of the Constitution), and clarity and closure (abstinence-only sex education; signed pledges to never raise taxes; aversion to compromise) do as well. Heightened response to the general category of negative stimuli fits comfortably with a great many of the typical tenets of political conservatism (23-24).

The evidence for increased negativity bias in political conservatives is readily available through a group of studies focused on physiological correlates of political ideology. Oxley et al. (2008) present evidence that conservatism is correlated with physiological reactions to non-political stimuli. In a group of non-student participants with strong political beliefs, individuals less tolerant of sudden noises and

fearful/disgusting visual images, tended to support increased defense spending, capital punishment, patriotism, and the Iraq War. Helzer and Pizarro (2011) find that asking research participants to wash their hands increased their stated preferences for conservative positions. Several studies have found that threatening stimuli are consistently more distracting for conservatives (Carraro, Castelli & Macchiella 2011, McLean et al. 2013). Negative stimuli such as angry faces attract the attention of conservatives more than they do liberals. Dodd et al. (2012) found conservatives spent significantly more time looking at negative images and were significantly quicker to “fixate” on those images (as measured by eye-track software) as well.

### **The Motivated Social Cognition Theory**

Political science has a consensus definition of political ideology as attitudinal constraint, and the discipline makes use of this definition to explore and explain political behavior. As mentioned earlier, however, some political psychologists have used a different definition and conceptualization of ideology. The major departure in theory is that political scientists have put abstract principles as the foundations of political ideology while these political psychologists believe root psychological needs are the foundation for the abstract principles. So, political scientists would believe a person is a liberal ideologue because they endorse certain abstract principles about fairness and equality. Endorsement of abstract principles leads to endorsement of political attitudes in an ideological way. Psychologists working on political ideology have typically taken a different perspective. In contrast, they would believe a person is a liberal ideologue

because they have psychological needs or sensitivities that make the abstract principles of fairness and equality appealing to the individual. Psychological needs lead to endorsement of abstract principles, which lead to endorsement of political attitudes in an ideological way.

The psychological theory has the potential to contribute much to political science's understanding of political ideology. In my view, the constraint theory may describe a defensible way to measure the presence of ideology, but it simply does not speak to why. Human beings seem strangely compelled by ideological beliefs and powerfully animated by ideas. Some have been willing to kill or die for abstract principles, committing great acts of atrocity or heroism (Jost and Amodio 2012, 55). The strength of these endorsements suggest that ideology is tied deeply to the self. Even the more everyday forms of ideological thinking can fundamentally bend the way that we are exposed to information and bias our information processing.

Ideology can motivate cognitive processes and behavior in several theoretical ways (Jost et al. 2009). First, ideology reduces uncertainty by suggesting preferences and providing a framework for analyzing new and old contexts and situations. Second, ideologies offer existential security, a way to cope with anxiety about death (see Becker 1985, also Greenberg et al. 1986 on terror management theory). Third, people are drawn to ideologies for reasons of affiliation, for belongingness and social strength as part of a group. People take an ideological perspective in politics that they find appealing—political scientists will not find that controversial—but they do so in part

because the ideology itself appeals to psychological dispositions and cognitive processes within the individual. Ideology offers “certainty, security, and solidarity” (Jost and Amodio 2012). Political scientists may find this controversial, or they may not, but it is certainly the case that this angle is understudied in mainstream political science literature.

One of Jost’s central arguments, however, is that not all ideologies are the same, and not all ideologies will satisfy the same needs. There are likely important psychological differences between varying ideologies, although researchers have not yet ventured outside of studying conservatism contrasted with liberalism (but see Iyer et al. 2012 for a look at libertarianism). Jost and his colleagues have focused on the left-right divide between political liberals and political conservatives (in contrast to, say, religious ideologies or social ideologies such as Social Dominance Orientation (Sidanius and Pratto 1999), but there are, no doubt, other ideological belief structures. In terms of political ideology, political psychologists have mostly followed political scientists and accepted the unidimensionality of political ideology.

The Motivated Social Cognition theory comes directly from Jost and colleagues (Jost et al. 2003). In an extensive meta-analytic review of 88 studies in 12 countries, Jost et al. (2003) found evidence that political conservatives exhibit more death anxiety, are less tolerant of ambiguity, have less openness to new experiences, have less tolerance for uncertainty, have more need for order, structure, and closure, and have more fear of threat and loss when compared to political liberals.

Jost and colleagues are not alone in their study of the psychological underpinnings of political ideology. Other researchers have suggested that conservatives have an increased wariness of out-groups that may be related to heightened feelings of threat in certain contexts (see Skitka & Mullen 2002, 119; de St. Aubin 1996; Stone & Schaffner 1988). Right-wing authoritarianism has a long history of being correlated with and being activated by threat (Lavine et al. 2002; Lavine et al. 2005). Nail and McGregor (2009) observed a movement towards conservative political stances in eight of eight items in two independent surveys of adults, one taken before 9/11 and one taken afterwards. Survey respondents reported increased support for conservatives, George W. Bush, and increasing military spending, and less support for socialization of medicine. Weber and Federico (2007) found that anxious attachment styles were associated with right-wing authoritarianism and mediated by belief that the world was a dangerous place. They also found that avoidant attachment styles were associated with social dominance orientation. The perception of a dangerous world is correlated with right-wing ideologies (Jost et al. 2003), and it is especially strong among political sophisticates (Federico et al. 2009). Hatemi et al. (2013) find that fear dispositions have a modest but significant relationship with conservatism out-group attitudes. Shook and Clay (2011) found that conservatives were more susceptible to conditioning with negative stimuli than liberals, and conservatives were less susceptible to conditioning with positive stimuli compared to liberals.

These correlations suggest conservatives have an aversive cognitive style, behaviorally motivated to avoidance, and in particular, avoidance of threat and the unknown (see also Dodd et al. 2012). This evidence highlights the distinct possibility that political conservatives have a more avoidant cognitive style.

### **Two Theories Measuring Two Different Psychological Constructs**

The two theories discussed above have much common ground. Both sets of authors tend to cite each other in support of their respective findings. In my view, however, it is clear that each theory is focusing on a specific psychological process distinct from the rest. We would benefit from sorting these mechanisms that underlie the two theories, which would allow us to gain much more specificity for our claims.

It is valuable to understand how sensitivity to avoidance (Motivated Social Cognition theory findings) impacts political attitudes. It is also valuable to understand how sensitivity to emotional negativity is correlated to political attitudes (Negativity Bias theory findings). These findings, however, have different underlying mechanisms. Affect is not the same as personality traits, and neither are the same as cognitive style. Yet, research in this field tends to lump all the findings together as if it is one portrait of conservatives.

The Motivated Social Cognition theory posits that conservative belief structures are motivated by psychological needs to reduce uncertainty, ambiguity, threat, and disgust (Jost et al. 2003). The Negativity Bias Theory argues that conservative belief structures are correlated with sensitivity to negative affect (Hibbing et al. 2013). Both



theories have consistent empirical support. While the two theories frequently cross-reference each other, there is little explanation for why both theories could or should co-exist. Or, put another way, regardless of the surface similarities, these theories are ultimately describing different mechanisms as the roots for these correlations. But what are those mechanisms? Is a disposition towards avoidance the same as a dispositional sensitivity to negative affect? How does cognition and emotion intersect to create behavioral outcomes? What we could use is a better specified theoretical link between these two profiles of political conservatism.

### **Gray's Theory of Behavioral Motivations**

Jeffrey Allen Gray offers a theory of behavioral motivation, which he envisioned as two complementary systems that underlie cognition, emotion, and behavior. The behavioral activation system (BAS) facilitates behavior towards the completion of a direct objective or goal. All of the small behaviors we take during a day are for some purpose, some goal. The goal may be short-term, fleeting, poorly considered, or it may be long-term and strategic. Regardless of what the goal is, and how much we have considered it, we act because we desire some outcome. BAS facilitates action. In contrast, the behavioral inhibition system (BIS) halts ongoing behavior in response to new information. This is our monitoring system, designed to help us react to unexpected changes in our environment. The behavioral inhibition and activation systems blend our cognition with our emotion in order to generate behavior.

Here is an illustration of how the dual systems operate. Sitting down with our laptop for work, we decide to have a sip of coffee. The BAS operationalizes the goal with our cognitive processes. We reach for the cup of coffee and bring it to our lips. We experience a mild sense of satisfaction, mild positive affect, which helps to motivate the action. Our goal is nearly achieved, something that we planned in our mind that was aided by emotion. As we look into the mug near our lips, however, we notice that a dead fly is floating on top of the coffee. Seeing the fly cues a disgust reaction, an arousing negative emotion, and we immediately halt our planned action to drink a sip of coffee. This is the BIS facilitating a rapid change of plans by interrupting our ongoing behavior in response to newly detected information. Again, the BIS integrates both cognition and emotion to trigger behavior.

BAS is about going while BIS is about stopping. BAS is connected to feelings of positive emotion, while BIS is associated with feelings of negative emotion. This theory has the potential to articulate the mechanisms underneath both theories as well as link them together directly. Below, we examine Gray's theories in more depth and outline several ways to study dispositional differences of political ideologues.

Researchers in psychology have a number of tools to investigate avoidance motivations and negativity bias, methods that can be used to help illuminate the psychological differences between liberals and conservatives. Below, I describe the most commonly used framework for studying emotion and behavioral motivation in

psychology, and then outline methodological tools from cognitive neuroscience that can be used to explore the question of emotional sensitivity in political ideology.

Gray's dual behavioral motivation systems—the Behavioral Inhibition System (BIS) and the Behavioral Approach System (BAS)—are a pair of heuristic devices developed to help explain animal and human behavior (Gray 1972, 1978, 1981, 1988). BIS can be thought of as a process for stopping when a potential threat or reward is detected, while BAS is a process for going forward to enact a plan of action (Demaree et al. 2005). Worded another way, BIS is an aversive system, while BAS is an appetitive system (Carver and White 1994).

BIS is thought to facilitate attention or sensitivity to cues of punishment, danger, avoidance, and novelty. Gray suggests that BIS functioning is responsible for feelings such as fear, anxiety, frustration, and sadness in response to cues (Carver and White 1994; Gray 1972, 1978, 1981, 1988). BIS functions to interrupt current behavior in order to process these cues in preparation for a response. High BIS activation is associated with enhanced attention, arousal, vigilance, and anxiety, and very strong BIS corresponds to anxiety-related disorders (Fowles, 1988; Quay, 1988).

The complementary system to the BIS is the BAS, which represents a motivational system sensitive to signals of reward, nonpunishment, and escape from punishment. BAS facilitates approach towards a reward (going toward), but also facilitates active avoidance away from a punishment (going away) (Amodio et al. 2008).

BAS has been associated with feelings of optimism, joy, aggression, and anger (Gable et al. 2000; Gray and McNaughton, 2000; Wingrove and Bond, 1998; Harmon-Jones 2003).

The BIS and BAS scales developed by Carver and White (1994) have been used extensively by psychologists to measure dispositions for behavioral approach and behavioral inhibition, as well as emotion. BIS, in particular, is associated with self-regulation (Amodio, et al. 2008) but has not been examined in the context of political ideology. Marcus et al. (2000) use Gray's BIS and BAS systems in their theory of Affective Intelligence, which demonstrates that anxiety increases political learning and enthusiasm increases political participation. They do not connect it to political ideology, however, which presents a clear opportunity to look at BIS and BAS in a survey questionnaire as a way to test for the psychological dispositions that Hibbing and Jost utilize in their respective theories.

### **Hemispheric Asymmetry and Psychological Dispositions**

Neuroscience has contributed in a significant way to the study of emotional affect and behavioral motivation, and we will need these insights in order to explore the psychological dispositions of avoidance sensitivity and negativity bias. By borrowing some of these methodologies, many grounded directly in Gray's work, we can find new tools to study how political ideology may be related to emotion and behavioral motivations.

One such tool is the measure of hemispheric asymmetry. Tomarken et al. (1990), found that participants in an electroencephalography (EEG) experiment who had greater

resting right frontal activity responded with more intense negative affect to negatively-valenced film clips, particularly those involving fear or threat (see also Wheeler et al. 1993). Davidson and colleagues (1993, 1998a, and 1998b) suggest relatively greater left frontal activity corresponds with trait tendencies toward a general withdrawal or avoidance system, a hallmark of Gray's behavioral activation system (BAS). This finding has been empirically verified by a number of different research groups (e.g., Carver and White 1994; Coan and Allen 2003, 2004; Harmon-Jones and Allen 1997, 1998; Sutton and Davidson 1997). Based on these findings, researchers now believe that the pattern of frontal hemispheric asymmetry is a biomarker for avoidance motivations and negativity bias. Yet, they were not able to distinguish between the two at the moment. As demonstrated, there are detectable left/right hemispheric differences in the strength of EEG signals in frontal electrodes, and this asymmetry may be a moderator and/or mediator of emotions, such as fear and anxiety (Coan and Allen 2004).

Coan and Allen, writing in 2004, report that the relationship between cortical asymmetries and emotion had been established by over 70 studies (2004, 7). In their review, they establish that resting levels of neural activity, as well as state-based activation, in the prefrontal cortex are correlated with trait predispositions and changes in emotional state. These findings suggest that brain systems tapped by frontal EEG asymmetries may moderate (in the case of activity) and mediate (in the case of activation) emotional responding. The consensus in this literature is that relatively greater right hemispheric frontal activity is associated with tendencies toward a general

avoidance or withdrawal system, which is then often correlated to negative affect (Coan and Allen 2003a; Coan and Allen 2003b; Davidson 1993; Harmon-Jones and Allen 1997, Sutton and Davidson, Davidson 1998a,b). Davidson's influential approach/withdrawal motivational model of emotion proposes that left frontal activity (either as state or as trait) indicates a propensity to approach or engage a stimulus, while relatively greater right frontal activity indicates a propensity to withdraw or disengage from a stimulus.

Other researchers have confirmed this relationship. For example, Field et al. (1995) and Fox et al. (1996) found evidence that children with greater right frontal activity at rest were more inhibited socially, and scored lower on social competency. Schmidt and Fox (1994) found a relationship between frontal EEG asymmetry and measures of sociability in adults. Those scoring low on measures of sociability had relatively greater left frontal activity. Schmidt et al. 1999 found shyness had greater right frontal activation. All of these studies from developmental psychology researchers suggest a relationship between avoidance and right frontal activity. EEG asymmetry promises to be a useful tool for studying avoidance sensitivity in political liberals and conservatives. Below, I briefly discuss political ideology as studied from a political neuroscience perspective, noting that no research has yet connected EEG asymmetry and emotional sensitivity with political ideology.

### **The Go/No-Go Task and Psychological Dispositions of Conservatives**

To date, three studies have explored the connection between dispositional styles in the brain and political ideology. None, yet, directly measure avoidance sensitivity or

negativity bias for liberals and conservatives, which is the project that this dissertation picks up. Amodio et al. 2007 hypothesized that differences in the cognitive styles of liberals and conservatives might reflect basic differences in information processing mechanisms, such as those involved in conflict monitoring—a neurocognitive process for detecting discrepancies between response tendencies and one’s higher-level intentions. To test this prediction, Amodio and colleagues compared participants’ self-reported political orientation with behavior and neural activity on a Go/No-Go task (explored in detail in Chapter Six). Consistent with the model of political ideology as motivated social cognition, liberalism was associated with greater behavioral accuracy on No-Go trials of the task. Furthermore, liberals’ EEG signal exhibited significantly larger event-related potentials (ERP), indicative of greater anterior cingulate cortex (ACC) response on No-Go trials than did conservatives, supporting the hypothesis that political orientation may be linked to basic neurocognitive processes for dealing with new and unexpected information.

Weissflog et al. (2010) also assessed ERP responses and political ideology, this time in a sample of Canadian university students who completed the Go/No-Go task. As in the Amodio et al. 2007 study, a stronger liberal orientation was associated with larger No-Go N2 amplitudes, indicating greater conflict-related ACC response, and thus replicating the results of Amodio et al. 2007. In addition, larger No-Go N2 and Event-Related Negativity (ERN) amplitudes in these college students were correlated with

greater endorsement of egalitarian values and lesser endorsement of right-wing authoritarianism.

Although they did not look at political attitudes or ideology directly, Inzlicht et al. (2009) indicated that higher religiosity was correlated with smaller ERNs in response to errors on a color-naming Stroop task (1937). As Jost and Amodio (2012) note, there is a strong association between conservatism and increased religiosity, and so this study may also be considered broadly consistent with the results of Amodio et al. 2007.

The intent of the above discussion is to open the subject matter, but more discussion and clarification of these studies is explored in more detail in Chapter Six, which explains the Go/No-Go task conducted for this dissertation, and presents a comprehensive look at what these findings mean for political ideology. In sum, this chapter outlined the two major theories of the political psychology of ideology as being fundamentally about (a) sensitivity to avoidance and (b) negativity bias. Then, it introduced Gray's theory of behavioral motivation. By using tools for studying Gray's Behavioral Inhibition System and Behavioral Activation System, such as survey questionnaires, hemispheric asymmetry studies, and the Go/No-Go behavioral task, we will be able to focus on these two important psychological processes and improve political science's understanding of the political psychology of ideology. The next three chapters present empirical studies of these psychological processes in a sample of liberals and conservatives, through a survey questionnaire and two laboratory experiments.



## CHAPTER FOUR

### SURVEY DATA AND DISPOSITION ANALYSIS

One of the central objectives of this dissertation is to expand research in the area of root physiological differences in avoidance sensitivity and negativity bias between liberals and conservatives through an investigation of Gray's theories of behavioral motivation systems. This chapter furthers this goal by (a) characterizing my participant pool for experiments in later chapters and (b) exploring correlational analysis between political ideology and self-reported dispositions towards behavioral inhibition and behavioral activation. Later chapters go beyond questionnaire self-reports to bring these questions into the lab.

This chapter describes and characterizes a large sample ( $n = 466$ ) of non-student employees drawn from Loyola University Chicago who completed a detailed survey about their personality traits and social-political viewpoints. From this larger sample, I drew a subsample ( $n = 51$ ) who participated in two behavioral neuroscience experiments that become the focus of this dissertation in later chapters. Therefore, this sample becomes an important starting place for characterizing the group of participants who go on to complete the lab experiments. Overall, we find that this sample is not nationally representative and skewed towards liberals, although a meaningful minority of participants do hold deeply conservative beliefs. This sample is considerably more

representative than a typical sample of college undergraduates. Additionally, as introduced in the last chapter, Carver and White (1994) have developed a questionnaire that allows researchers to estimate dispositional sensitivity to behavioral inhibition and behavioral activation, which will help us investigate avoidance sensitivity differences between liberals and conservatives in a large sample size.

Behavioral motivation is an interesting, important psychological and physiological process that could be of importance for political ideology. Borrowing heavily from the theories of Gray (1990; Gray and McNaughton 2000), psychologists Carver and White (1994) devised a questionnaire to tap into behavioral motivations with a survey instrument. This measure has become a seminal contribution, with over 4,000 citations and continuing to grow in influence. While behavioral motivations will always be best measured through experimental manipulation and observation of actual behavior, there are numerous situations where a survey can provide important information in a cost effective way. Experimental costs for a large sample may be prohibitive, and/or time available for experiments may be scarce. A survey instrument can be issued quickly, at lower cost of time and effort. Finally, observational data from a survey can serve as an effective way to assess personality dispositions towards behavioral inhibition and approach in a large sample. Observational data about self-described personality traits can be useful to investigators.

The rest of this chapter follows from these goals. Primarily, this chapter details the social, political, and demographic characteristics of the large sample, which itself will

serve as the participant pool for two behavioral experiments in subsequent chapters.

Additionally, this survey collected observational data on sensitivity towards Gray's dual systems of inhibition and activation, which is hypothesized to be related to political ideology. By combining the observational data in this chapter with the experimental data in later chapters, we use a multiple method approach to answering the central question of the relationship of Gray's BIS/BAS systems to political ideology.

### **Behavioral Inhibition and Activation**

J.A. Gray hypothesized that two general motivational systems for behavior underlie our emotional and cognitive processing (1990; Gray and McNaughton 2000). The behavioral activation system (BAS) facilitates action in pursuit of a desired outcome. The behavioral inhibition system (BIS) is a surveillance system, intended to monitor the environment for unexpected changes that may threaten or change our goal-directed behavior.

As described in the past chapters, BAS is about going while BIS is about stopping. Additionally, research has demonstrated that increased BAS has been connected to feelings of positive affect, and increased BIS is associated with feelings of negative affect. BAS is a process for going forward to enact a plan of action while BIS interrupts when a potential threat or reward is detected. For these reasons, Carver and White (1994) describe the BAS as an appetitive system, while BIS is an aversive system. BIS draws attention to cues of punishment, danger, and novelty, and is theorized by Gray to be responsible for negative emotions of fear, anxiety, frustration, and sadness. BAS

motivates behavior towards a reward or a desired interaction and is associated with feelings of optimism, joy, aggression, and anger. Recall from earlier discussions that approach can be positively valenced (optimism, joy) or negatively valenced (aggression, anger) as long as the emotions motivate engagement with a stimulus instead of avoidance.

I have argued in past chapters that Gray's dual systems underlie two of the most prominent theories about the political psychology of political ideology. First, the Motivated Social Cognition Theory (of John Jost and colleagues) is built upon the theory that conservatives are motivated by a constellation of psychological factors related to fear, threat, and reducing uncertainty. These core psychophysiological functions, especially of fear and threat, are a kind of behavioral avoidance clearly rooted in Gray's behavioral inhibition system. While it is true that uncertainty avoidance is not purely the same psychological construct as behavioral inhibition, the overlap is substantial. As Jost and colleagues write, uncertainty avoidance in conservatives is part of a general predisposition towards caution and general avoidance (Jost et al., 2003; Jost et al., 2009). Jost and colleagues also frequently mention a study of children that describes "inhibited" preschoolers as growing up to become political conservatives (Block and Block 2006; as cited in Jost et al., 2009; Jost, 2009). Given that motivational avoidance and inhibition have substantial overlap, and Jost's theories find great empirical support for the claim that conservatives are more avoidant, we can also predict that conservatives would be more inhibitory as well.

According to the Negativity Bias Theory, conservatives exhibit stronger reactions to negativity, and focus more visual attention to negative stimuli (Hibbing et al 2014). Negative affect includes many different emotions, such as fear, threat, sadness, and anger. (The connection between discrete emotions and political ideology is picked up with force in Chapter Five of this dissertation.) Negativity bias is also connected to feelings of fear and threat, and they motivated behavioral avoidance of the stimulus that triggers the negative emotion.

### **Hypotheses**

In sum, the key hypothesis for how Gray's dual systems may be related to political ideology is that conservatives should have greater behavioral inhibition. Jost's work on conservatives and avoidance and Hibbing's work on negative emotions each point to this conclusion.

Behavioral activation predictions are less clear, and will be approached as exploratory in this work. Behavioral activation is related to sensitivity to approach, as well as positive emotion. Because being sensitive to negative emotion cannot speak to whether someone is also sensitive to positive emotion, we do not have direct hypotheses from current work. There is nothing in the Jost or Hibbing theories that suggest conservatives or liberals have a relationship to behavioral approach or positive emotion. Behavioral inhibition and behavioral approach are conceptually separate from each other, not two ends to the same phenomena. Positive and negative emotion, too, are not inverses of each other, but separate constructs.

## **Method**

### *Participants*

Participants were recruited from the campus staff of Loyola University Chicago from February 2012 until November 2012. This recruitment method was inspired by Kam et al. 2007 as a good convenience sample to utilize when an undergraduate sample poses research problems. As Sears 1986 noted, college aged students are likely to have more weakly held social and political attitudes (522) and may exert more cognitive effort than the typical person due to the emphasis on accuracy in a school setting (525). Of particular importance is their young age and their (understandable) lack of broad life experiences compared to national populations.

I sent 1144 emails to non-student adults employed by Loyola University Chicago, inviting them to take our online survey on political attitudes and personality. The survey was created and administered on Opinio software (<http://www.objectplanet.com/opinio>) with access provided by Loyola University Chicago. My outreach included all employees at the Lake Shore Campus or the Water Tower campus, except those who were academic faculty or higher-level administrators (above the title of “director”). Three follow-up attempts were made. First, a reminder email was sent after 30 days. Second, I also mailed physical copies of the survey through interdepartmental mail approximately three months after my initial email contact. Third, I sent a final email reminder. Overall, I received a total of 466 completed surveys (40.3% response rate). I did not offer compensation for completing the survey;

however, the materials mentioned that successful completion of the survey may make one eligible for a follow-up neuroscience study which would pay more than \$40/session. 280 of those who completed the survey (60%) also volunteered to be considered for the follow-up study in the lab. Eventually, a selection of 51 of these volunteers became subjects of the behavioral and neuroscience studies in later chapters of this dissertation.

*Participant demographic background.* This sample was disproportionately female (286 females, 176 males, and 4 refused). The median age of the sample was 38 years old, and age ranged from 20 to 93 years old ( $mean = 41.33, sd = 13$ ). Ninety-three is not an error: a small number of participants of advanced age live and work at Loyola University Chicago in various departments, but are especially found in numerous Jesuit groups and organizations housed on campus. 72 percent of respondents identified as white, 11.6 percent as black, 6.3 percent as Asian, and 10.1 percent as other/multiracial. The sample was disproportionately educated compared to the national population, which is to be expected given these are workers employed by a university. 38 percent hold a bachelor's degree and 36 percent hold a master's degree. 8 percent of the sample had a professional degree or Ph.D. Only 16.8 percent of the sample did not have at least a bachelor's degree.

*Party identification.* Party identification fit expectations (Kam et al. 2007) that the campus staff would largely resemble the Democratic politics of the surrounding region generally. 79 percent of the respondents identified as Democrats, 9 percent as independents, and 11 percent as Republicans. These numbers include those who said

they leaned toward a party. Only 11 participants in the entire sample considered themselves “strong Republicans” (2.4 percent), an exceptionally low amount compared to the national population. This sample skewed heavily Democratic, an expected result for a university located in Chicago.

### **Measurement**

Broadly, this survey questionnaire addressed two categories of attitudes: political ideology and behavioral motivations. Full question wording is provided in Appendix A.

*Political ideology.* Three different question sets were used to assess political ideology, with each designed to tap into a different conceptual element of political ideology. Much previous research has relied on the 7-point self-identification Likert scale. Following the standard set by the American National Election Studies, participants are asked to place themselves on a 7-point scale between “very liberal” and “very” conservative, with the middle labeled “centrist.” Self-placement on this scale is strongly predictive of party identification as well as vote choice in national elections. The self-placement scale also allows a measure of how the individual sees their own political ideology, providing a summary judgment of how the individual would self-classify their own belief structure. However, there are some potential weaknesses. First, the respondent must have a sense of what the terms conservative, liberal, and centrist mean, which requires a certain amount of political knowledge. Second, like all self-reports, there are a number of opportunities for purposeful and inadvertent



misrepresentation. Third, this scale presumes a one-dimensional ideological spectrum, which, as discussed in prior chapters, may be problematic.

To compensate for weaknesses with the self-report, I also used a variation of the Wilson-Patterson Conservatism scale of political ideology (1968), which asks respondents for their opinion on a variety of contemporary public policy topics and then aggregates the results into an overall ideology score. Political ideology has often been conceptualized as the summary of your various political attitudes—after all, if you take the liberal view on most political arguments, you are probably liberal. One way to measure political orientation, thus, may be to ask your opinion on a variety of political topics and then see what the aggregate picture is. The Wilson-Patterson scale has been a popular measure of political orientation by using the summation of various political attitudes on political issues of the day. These question items need to be updated to the contemporary political setting, and so I adopted the modified Wilson-Patterson battery utilized by Smith et al. (2011). Twenty questions are included in the Smith et al. variant.

Additionally, although the theoretical conception of political ideology should be universal to human beings, there is little question that answers to contemporary political ideology question batteries are going to be bounded by cultural and national contexts. This sample is drawn from the United States, and the question sets listed above have been primarily used on subjects in the United States. To broaden our reach, I use four questions adopted from the World Values Survey that offer attitudes on competition, income inequality, public ownership, and private responsibility. These

questions have been used reliably across the globe to look at attitudes toward political economy issues, especially concerning economic justice. These questions are useful as a way to measure collectivism versus individualism in economic policy, and they offer a more diverse measuring stick with applications outside of the United States. This scale is referred to as the World Values Survey Economic Justice scale.

*Multidimensional ideology.* The Wilson-Patterson items collected here are usually utilized as a measure of unidimensional ideology, running from liberal to conservative. However, the underlying items of the scale could be analyzed along additional dimensions. Commonly, ideology is broken into two dimensions: economic and social (Treier and Hillygus 2009; Ellis and Stimson 2012). Economic (or, fiscal) conservatism suggests a strong preference for free markets and opposition to government regulation and taxation. In contrast, social conservatism is a skepticism towards social changes and preference for more traditional social mores, such as the traditional family structure. Splitting ideology in two dimensions allows for a better measurement of libertarian (economically conservative, socially liberal) and authoritarian (economically liberal, socially conservative) ideological archetypes.

I account for, and anticipate, multidimensional ideology in two ways in this chapter. First, I utilize factor analysis below to determine how well multidimensional ideological values fit this sample. Second, however, as this sample is not nationally representative, it would not have been appropriate to use the factor analysis to derive dimensions. There is no guarantee that employees of Loyola University Chicago would

represent the normal dimensions of political ideology (social and economic factors). So, I created two subscales designed to tap into economic and social dimensions based on the well-known and reliable Wilson-Patterson scale and prior researchers (Treier and Hillygus 2009). The economic conservatism subscale includes these items: welfare spending, tax cuts, small government, and foreign aid. The social conservatism subscale items chosen were: prayer in school, legal pornography, illegal immigration, death penalty, the Patriot Act, biblical truth, gay marriage, and legal abortion. These two subscales are theoretically derived, based on researchers work on the multidimensionality of political ideology (Treier and Hillygus 2009; Ellis and Stimson 2012).

*Behavioral Inhibition and Behavioral Activation Scales.* BIS and BAS were assessed in the conventional manner described in Carver and White (1994). All BIS/BAS questions ask the respondent to say whether they strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement. These question batteries assess an individual disposition towards each motivational system (aversive and appetitive.) BIS has a seven items and BAS has thirteen. Specific items are listed in Appendix A with the rest of the survey.

## Results

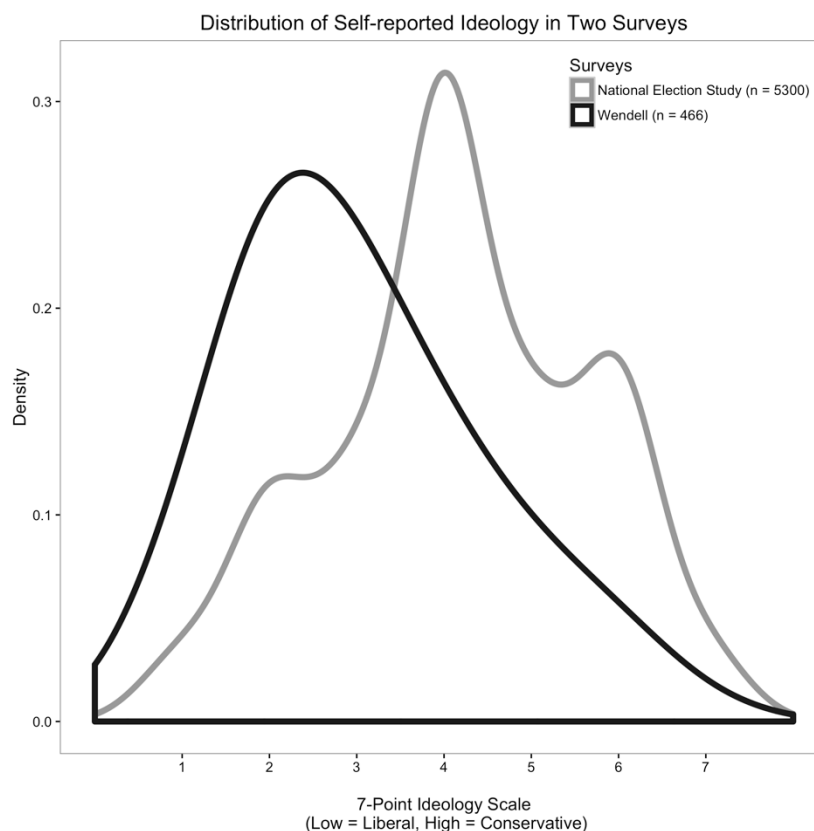
### *Descriptive Statistics*

Table 1. Descriptive Statistics of Survey Measures.

	n	mean	sd	median	min	max	range	skew	kurtosis	se
age	456	41.33	13.42	38	20	93	73	0.57	-0.66	0.63
Self-report Ideology	455	3.04	1.41	3	1	7	6	0.67	-0.21	0.07
Wilson-Patterson (Full)	466	6.7	3.79	6.25	0	16.5	16.5	0.36	-0.68	0.18
Wilson-Patterson (Economic Subscale)	466	1.66	1.3	2	0	4	4	0.28	-1.03	0.06
Wilson-Patterson (Social Subscale)	466	2.62	2.25	2	0	8	8	0.47	-0.93	0.1
World Values Survey Economic Justice Scale	444	19.51	6.5	19	0	36	36	0.32	0.16	0.31
Behavioral Inhibition	457	12.8	3.22	13	2	21	19	-0.09	0.23	0.15
Behavioral Activation	443	23.91	4.76	24	10	38	28	0.24	-0.06	0.23

Table 1 displays the descriptive statistics for the major variables of interest. The varying sample sizes of the statistics reflect the existence of missing data from the survey instrument.

Figure 1: Survey Data Compared to National Sample



The self-report ideology scale (*mean* = 3.04, *median* = 3) skews leftward, reflecting greater self-described liberalism in the sample. While the seven point scale has representation at each score, extreme conservatives are scarce. Figure 1 illustrates how the distribution of ideology differs from a nationally representative survey. The American National Election Study of 2012 includes the same survey question that I utilize to generate a self-report of political ideology on a seven point scale.

The Wilson-Patterson Conservatism scale has a similar left-ward skew (*mean* = 6.7, *median* = 6.25). The theoretical range goes from 0 to 20, but the most conservative members of this sample cap at 16.5. (Participants that answered neither “support” nor

“oppose” are scored as a 0.5, as per Smith et al. 2011.) As with the self-report measure, moderate liberals and strong liberals are overrepresented while conservatives are underrepresented. Both of the Wilson-Patterson subscales follow similar patterns as the full scale, except the sample is far more socially liberal than economically liberal.

The World Values Survey Economic Justice Scale is considerably more moderate than the other measures, reflecting two insights. First, the WVS is written for a global audience, and Americans are more economically conservative than most countries. Second, this scale has no social conservative elements in it, and thus, the very liberal viewpoints on social issues does not weigh the measure toward the left in this scale as much as others. This scale features of mean of 19.51 and median of 19, on a 0 to 36 point scale, and participants in the survey had values at both poles of the scale. While there is a left-ward skew to the data, attitudes about economic justice are not as strongly left as the other ideological measures, suggesting that the sample may be more socially liberal than it is economically liberal (which is consistent with the story told by the Wilson-Patterson Social conservatism scale, which has a median value of 2, with a scale maximum of 8).

Figure 2. Distribution of Political Ideology.

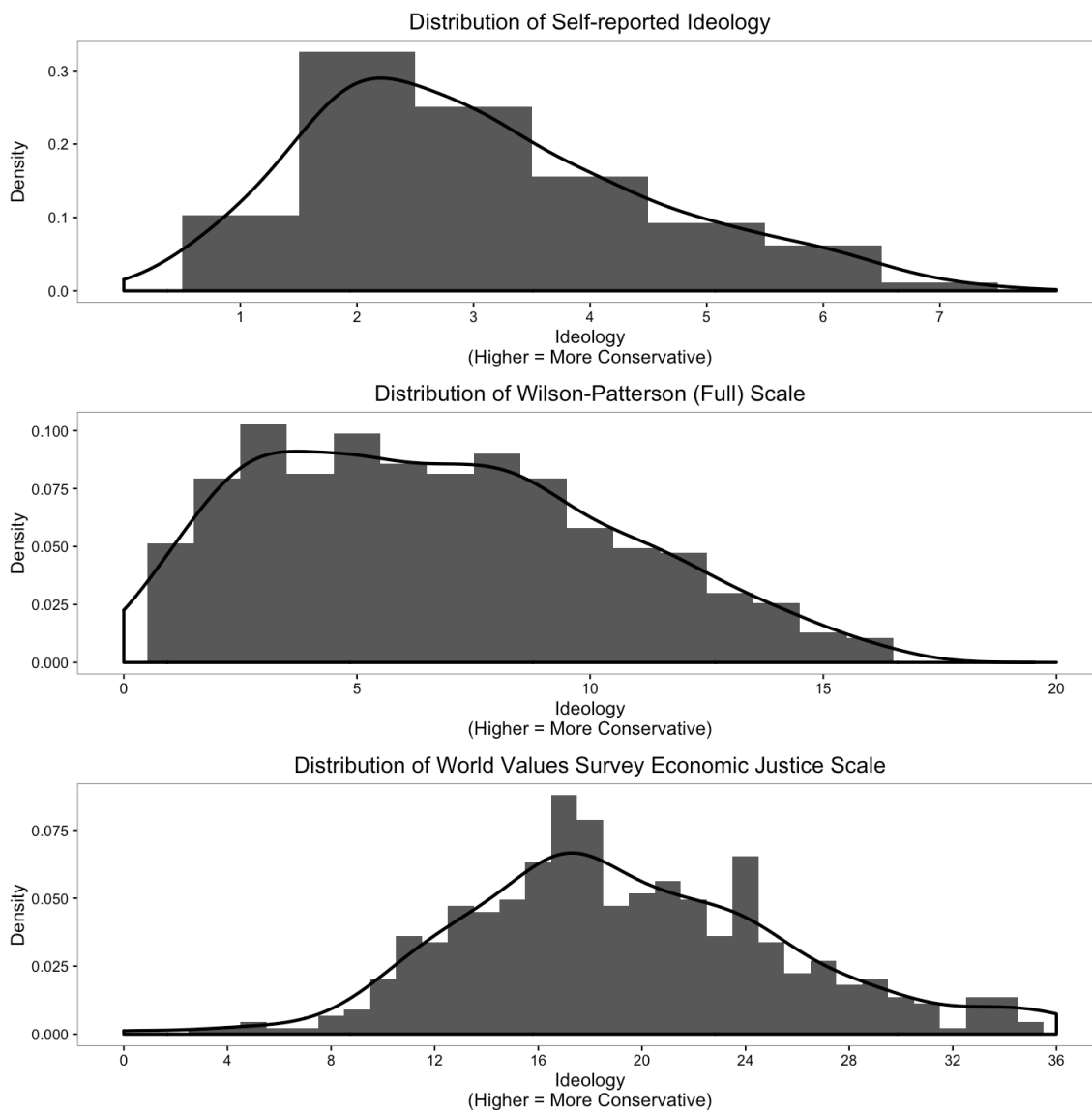


Figure 2 visually represents the distribution of ideology in the survey sample across the three ideological measures of self-placement, Wilson-Patterson Conservatism scale, and the World Values Survey Economic Justice scale. Note that the range of all x-axes are drawn from the scale minimum to the scale maximum, *not* the observed range of the data from this sample. For example, although no subject scored a maximum of

20 (100 percent conservative) on the Wilson-Patterson scale, the x-axis includes that maximum value of 20. Drawing x-axes to the scale dimensions facilitates better visual interpretation of the ideological preferences of the sample within each plot, as well as comparison between each plot.

Figure 3. Distribution of BIS/BAS Scales.

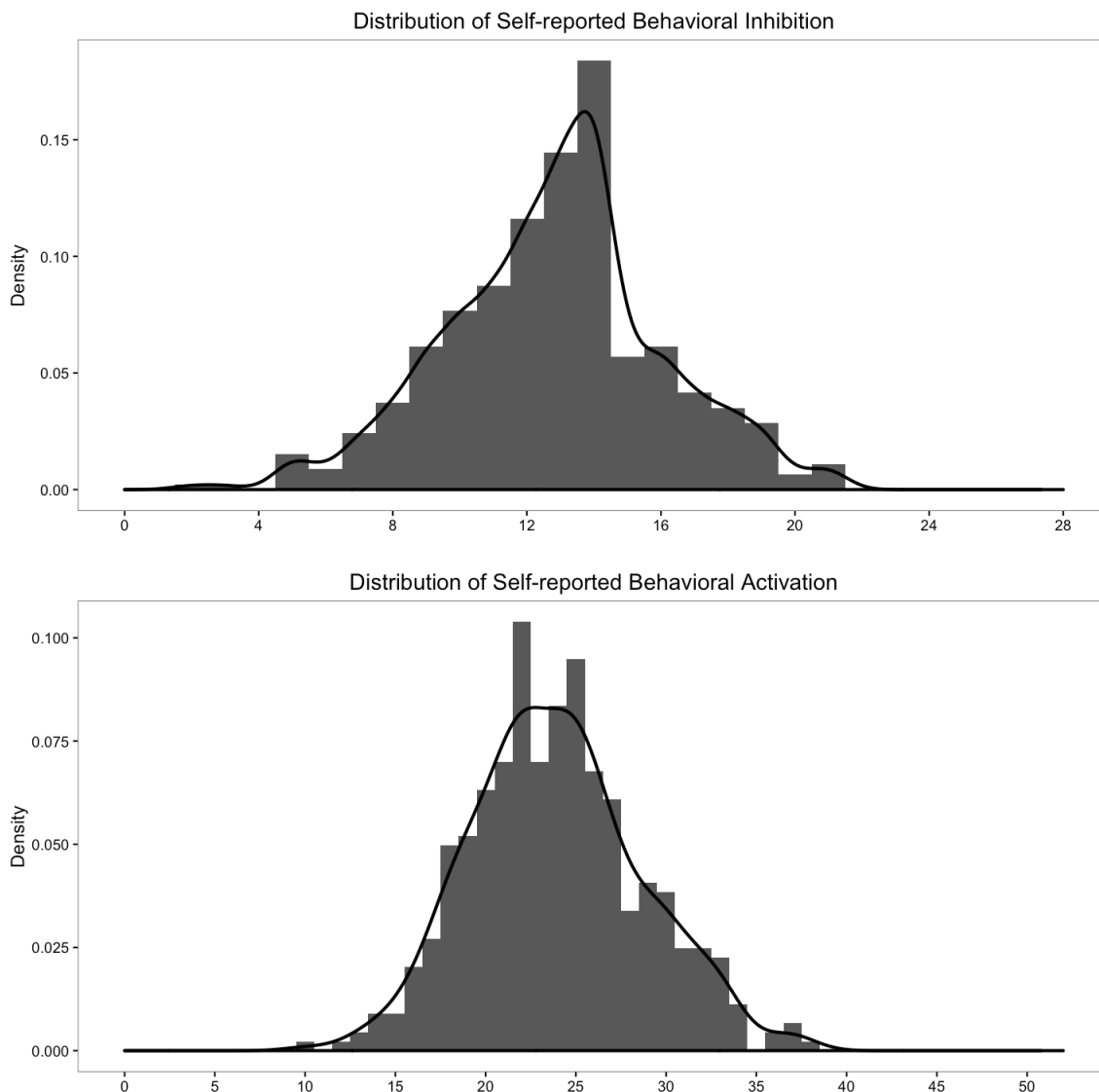




Figure 3 demonstrates the distribution of Carver & White's BIS/BAS scales of behavioral motivation in the sample. Both shapes are essentially normally distributed around the middle of each respective scale, with few outliers and zero extreme values to the far left or right.

### Correlation Matrix

Table 2. Correlation Matrix of Important Variables.

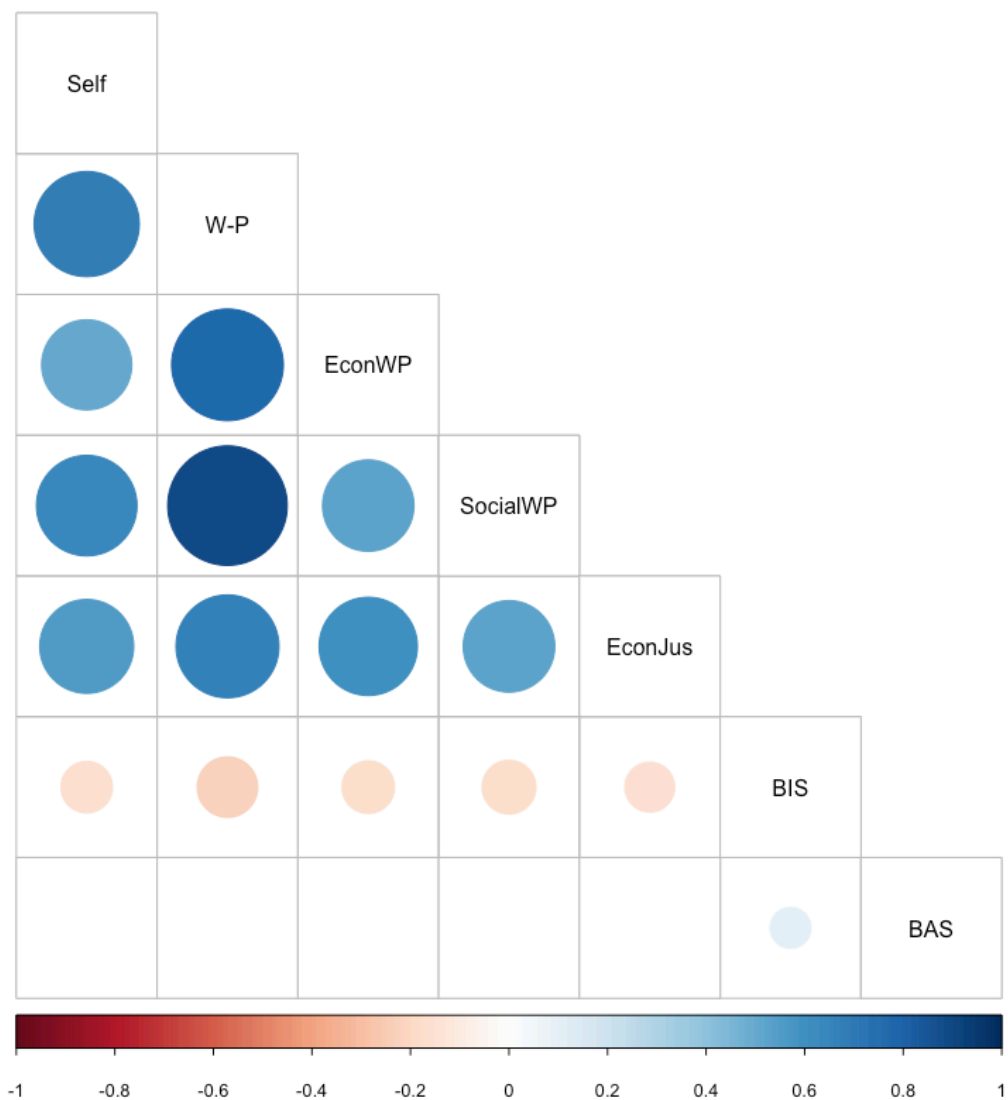
	Self-report	W-P (Full)	W-P (Econ)	W-P (Social)	Econ. Justice	BIS
Self-reported ideology						
Wilson-Patterson (Full)	0.690***					
Wilson-Patterson (Econ)	0.507***	0.778***				
Wilson-Patterson (Social)	0.631***	0.891***	0.521***			
Economic Justice	0.551***	0.661***	0.603***	0.523***		
Behavioral Inhibition	-0.164***	-0.227***	-0.170***	-0.179***	-0.154**	
Behavioral Activation	-0.054	-0.031	0.043	-0.076	0.041	0.103*

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ . Correlation tests are two-tailed.

Note: All ideology measures scaled so that lower value is more liberal, higher is more conservative.

Table 2 displays the correlation matrix for the variables of interest in this study, with Pearson's correlation tests. Below is a visualization of these relationships.

Figure 4. Correlation Matrix Visualization



These relationships can also be clearly seen in Figure 4. The darkness of the shading and the size of circle both indicate the strength of the correlation, with blue coloration representing a positive correlation and red being negative. Any relationship that is not statistically significant to the  $p = 0.05$  standard is represented with a blank (all white) space on the matrix. As can be observed, all relationships between the variables

do reach statistical significance, except for those between the BAS measure and any political ideology measure.

The table and visualization demonstrate that all five ideological measures are tightly correlated, forming a strong cluster of related measures. Additionally, all measures of ideology are negatively correlated with the behavioral inhibition scale measure, with mild strength. In contrast, BAS has no relationship with any ideological measure, and only a mild positive relationship with BIS.

### *Scale Reliability*

Often, social science research relies on a bundle of questions that are used to approximate some kind of underlying construct. For example, some researchers believe that political ideology cannot be accurately assessed by the simple question, “what is your political ideology?” Participants may not be consciously aware of their political ideology, they may not know what political ideology means, they may be overly influenced by a negative association with a political label, or for various other reasons may misrepresent or miscalculate their own political ideology. Researchers facing this challenge may wish to employ a battery of questions such as the Wilson-Patterson scale, which attempts to assess political ideology by asking twenty questions about contemporary political issues. By looking at the big picture of these twenty issues, it may be possible to triangulate the political ideology of a person without needing to rely on the subject’s self-assessment. In these cases, it would be useful for researchers to

know (and, also, to demonstrate to reviewers) that the bundled items were appropriately chosen to estimate the latent construct.

In situations like this, social scientists have come to rely on Cronbach's alpha to measure the internal consistency of a scale. Cronbach's alpha is a coefficient that examines to what degree the items are related as a group. A higher alpha coefficient signifies more internal consistency, meaning that the items are more closely measuring the same thing. In practice, researchers frequently employ Cronbach's alpha to justify their scale as assessing a single unidimensional latent construct, a practice that has been widely criticized in the psychometric literature. Psychometric researchers have established that Cronbach's alpha cannot determine the dimensionality of the underlying construct, but instead merely the degree to which the items are consistently related to the construct (Green et al. 1977; Schmitt 1996). The underlying construct may be unidimensional or multidimensional and still yield a high alpha score.

Interpreting alpha scores is based on consensus and rules of thumb, much like assessing p-values. The general practice is that an alpha score greater than 0.70 is "acceptable," with 0.80 considered "good," and greater than 0.90 to be "excellent" (George and Mallery 2003). These are guidelines and not hard rules, however. Alpha scores of 0.60 are sometimes used with caution, particularly if the scale has been validated elsewhere in a more nationally representative sample. It is not unusual for studies with non-representative samples to have a weaker Cronbach's alpha coefficient.

Such studies can still justify the use of a scale if it has empirical support from more definitive articles with more complete samples.

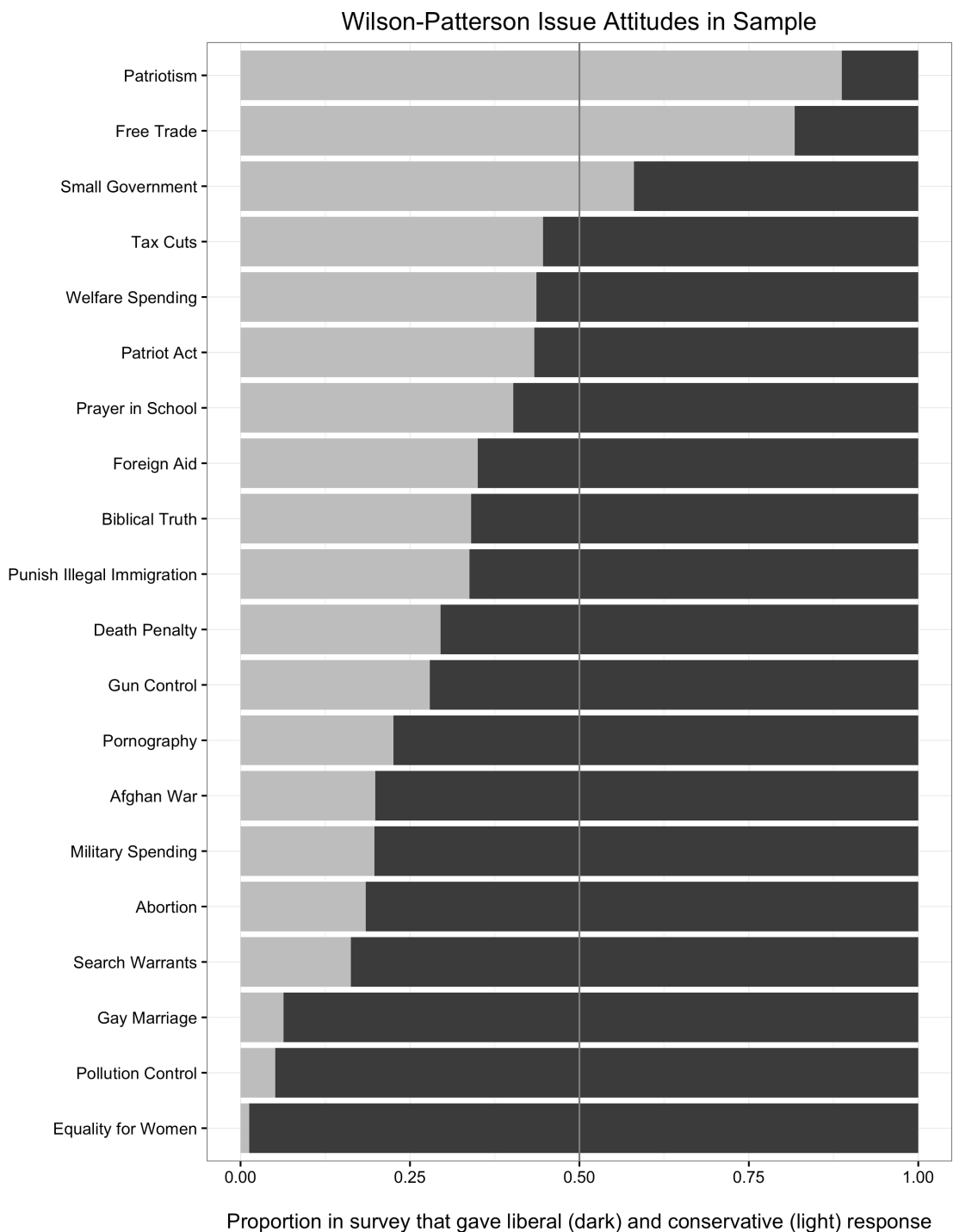
Table 3. Cronbach Alpha Scores of Scale Measures.

	Cronbach's Alpha
Wilson-Patterson (Full)	0.803
Wilson-Patterson (Econ)	0.611
Wilson-Patterson (Social)	0.764
Economic Justice	0.700
Behavioral Inhibition	0.801
Behavioral Activation	0.843

Table 3 lists the Cronbach's alpha scores for the scales employed in this study. The Wilson-Patterson Full Scale, and the twin behavioral motivation scales of Carver and White (1994) all maintain healthy alpha scores of around 0.80, signifying "good" internal reliability. All three scales are widely used in academic research, and so it is not a surprise that they replicate well with this sample. The two Wilson-Patterson subscales derived from theoretical perspectives have more questionable alpha scores, with 0.611 and 0.764. Prior literature has not attempted to derive an economic conservatism and a social conservatism factor structure from the Wilson-Patterson battery, and these alpha scores suggest caution when interpreting findings. As this sample is not nationally representative, we might not be surprised to discover that the theoretical factor structure of economic and social conservatism does not fit well the liberal denizens of the workforce of Loyola University Chicago. (We will see shortly that economic

conservatism is not so clear cut in this sample according to factor analysis.) Because of the clear utility in investigating ideology with these two factors, this work will proceed in utilizing the two scales, but interpretation will be exploratory and cautious. Finally, the World Values Survey Economic Justice scale is also novel to this work. With an alpha score of 0.700, it hovers in the “acceptable” range of internal consistency.

Figure 5. Distribution of Individual Wilson-Patterson Items.



Earlier, we have already viewed the distribution of aggregate Wilson-Patterson scores in this sample. Figure 5 explores the ideological polarization of the sample on a per-item basis within the Wilson-Patterson scale. Each item was labeled simply with the labels on the y-axis (e.g. “Prayer in Schools” and “Gay Marriage”) and participants are directed to either “support” or “oppose” the topic by choosing the answer that is closest to their belief. These answers are coded as liberal (or conservative) if they support a liberal (or conservative) belief. For example, welfare spending is traditionally a liberal belief—if a participant chose “support”, that would be coded as a liberal answer.

Items in Figure 5 are arranged from the item which received the greatest proportion of conservative responses (patriotism) through the item that received the greatest proportion of liberal responses (women’s equality). Overall, there is considerable political diversity across the span of issues, although there is a noticeable left-ward skew to the attitudes reported. Only three items had more conservative support than liberal support (patriotism, free trade, and small government). On the 17 other items, the liberal viewpoints is endorsed by a majority of respondents. Although failing to capture the majority on most issues, a healthy conservative minority is readily apparent in most of the remaining items.

There are three exceptions, however—three issues that have very little support for the traditional conservative position in this sample. Gay marriage, pollution control, and equality for women each feature 95% of the sample taking the liberal side of the issue. While women’s equality and pollution control could be explained by changing



societal attitudes towards women as well as the largely bipartisan support of pollution control in a major American city, the lack of political diversity for the issue of gay marriage is somewhat puzzling. Gay marriage is one of the most polarizing issues throughout the 1990s and 2000s, defining one of the sharpest cleavages between liberals and conservatives. It is possible that the conservative, educated denizens of Chicago had already shifted the gay marriage argument out of the culture wars, in acknowledgement that times have changed or will change (this survey was administered in 2012, and shortly afterward in 2015, the Supreme Court in *Obergefell v. Hodges* ruled that gay marriage was a constitutional right, effectively winning that pitched battle for the liberals.) More likely, though, the lack of conservative opinion about gay marriage reflects the dearth of social and religious conservatives in my sample.

Overall, the distribution of Wilson-Patterson items helps illustrate the left-ward skew of the subjects, but also note that conservative viewpoints are still represented. Below, we turn to a factor analysis in order to sort out the dimensionality of the Wilson-Patterson data.

### **Wilson-Patterson Factor Analysis**

As discussed in earlier chapters, political scientists increasingly view political ideology as multidimensional, and yet, the self-report measure and the political issue attitude battery employed here are unidimensional, assuming participants to be either liberal or conservative, or somewhere in-between. Yet, in the public, we know this simple picture to be false. There are some in the public who are socially liberal, yet

economically conservative. They may or may not identify as political libertarians, or even understand what that term means; and yet, they fit a profile that cannot be easily placed on a bidirectional scale.

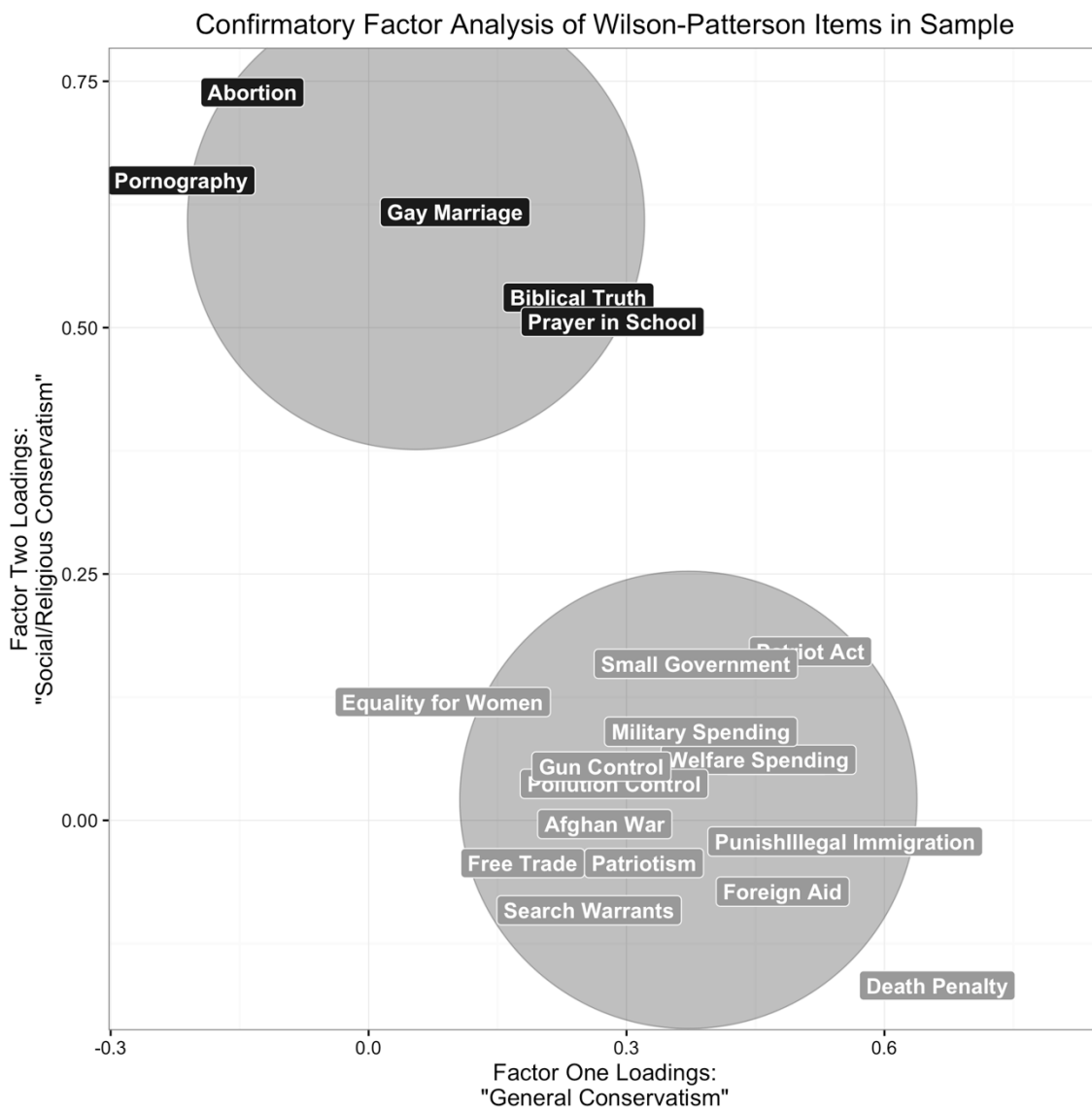
This sample is not nationally representative, so an exploration of the underlying factor structure of ideology in this sample cannot easily serve to teach us about the multidimensionality of attitudes in the general public. Based on prior research that does use representative samples, we have expectations that there ought to be an economic factor and a social factor. Earlier, this chapter describes how I developed two subscales of the Wilson-Patterson battery that attempts to capture those two elements.

There are at least two reasons to explore the underlying factor structure of this sample, even if it is not nationally representative. First, we ought to see how well the theorized social and economic factor structure fit this sample. Does an economic factor emerge? Is a social factor observable? And, second, to what degree are there any latent ideological factors at all within the sample? If issue attitudes did not cluster whatsoever in this sample, it would suggest that Conversionian political ideology (where issue attitudes are constrained around some kind of latent underlying value structure) is not a relevant issue.

Confirmatory factor analysis requires the researcher to stipulate a theory for how many factors should be present. I hypothesize that there will be two factors, a social and an economic kind of conservatism, based on contemporary research on this subject. My confirmatory factor analysis was conducted on the twenty Wilson-

Patterson items, utilizing a method of oblique rotation called promax, and with a model specification of maximum likelihood. The factor analysis was performed in R Statistics, using both the base package native to R as well as the supplemental R package “psych” written by William Revelle of Northwestern University (Revelle 2016). This factor analysis procedure will yield two sets of loadings (one for each proposed factor) for each item of the Wilson-Patterson scale.

Figure 6. Factor Analysis Scatterplot.



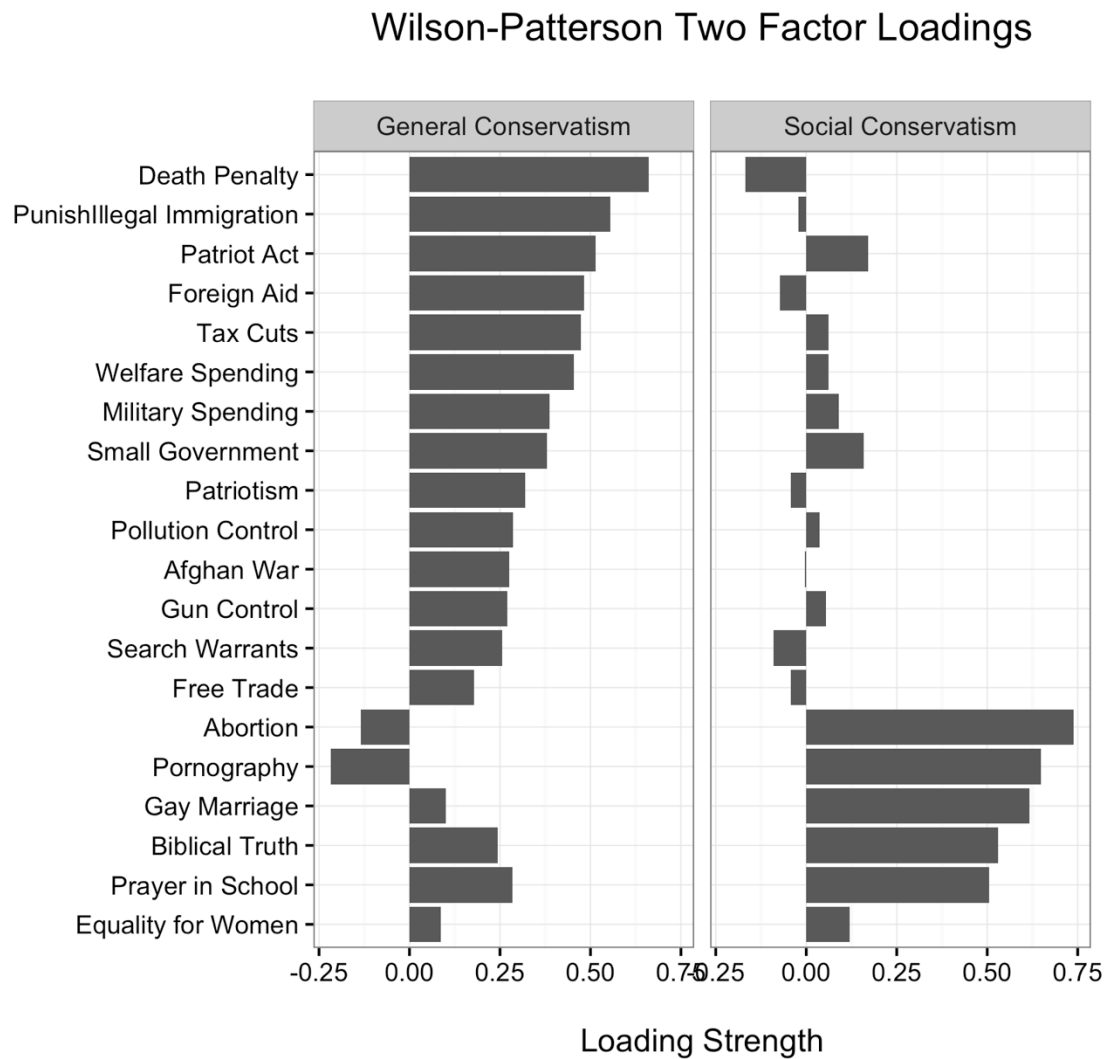
I will present two visualizations that help illustrate the factor structure apparent in this sample. First, Figure 6 represents the factor analysis as a scatter plot. Each axis represents one of the factors, and the W-P item is plotted on the Cartesian plane. In this figure, you can observe two clear clusters of attitudes have emerged (I have colored

them black and gray). The gray circles are centered at the factors' mean loadings, and are sized to help visually connect the clusters.

The black items load very strongly on Factor Two (y-axis), while being fairly weak on Factor One (x-axis). This factor includes many socially and religiously conservative issues: legal pornography, legal abortion, gay marriage, biblical truth, and prayer in school. I interpret this factor as a good representation of the "social" conservatism factor we expected to find. Note that equality for women, punishing illegal immigration, and death penalty are also socially conservative viewpoints, but they did not load strongly on Factor Two as would have been expected. Equality for women simply had no variability in this sample, and so the factor analysis could not adequately sort this item. On the death penalty, Illinois has had extreme problems with the death penalty for decades, with a Republican governor in 2000 declaring a moratorium on death penalty cases after thirteen people were found wrongfully convicted. So, while the death penalty ought to be in this factor, the context of living in Illinois probably altered the normally expected factor structure.

The gray items, in contrast, do not have so clear a theme. These issues span from international affairs and national defense, to free market economics, to immigration and the size of government. Factor One does not appear to be an economic factor, as expected, but instead it is a kind of general conservatism. For example, gun control, patriotism, the Patriot Act, and the death penalty are not primarily economic issues.

Figure 7. Factor Analysis Barplot.



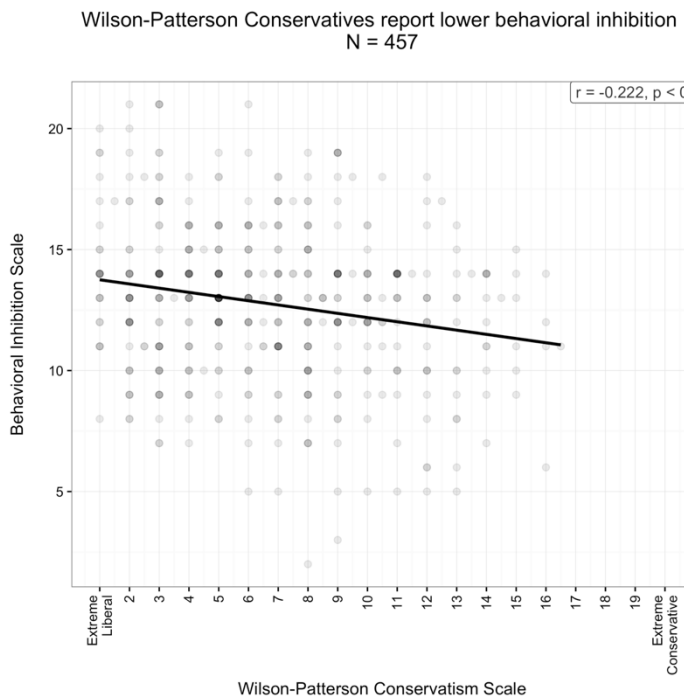
In Figure 7, the loading information is presented in a different form which will aid in demonstrating how cleanly the factor analysis divides the items. The length of the bar represents the strength of the loading. Generally, the items cleanly position in one factor and not the other (the exception being free trade and equality for women, which had almost zero variability within the sample anyway).

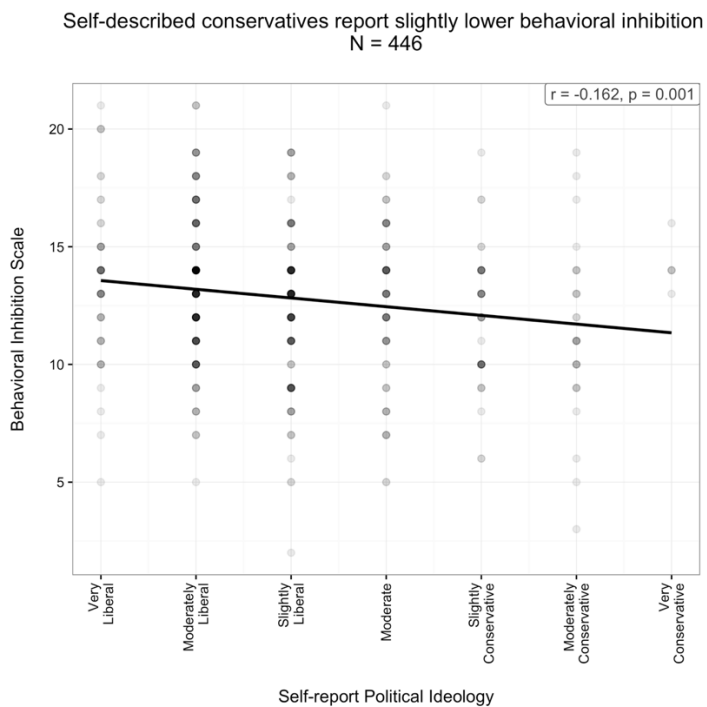
Overall, we find support for the idea of a two-factor system of political ideology in this sample, although the factors are not cleanly a social factor and an economic factor.

**Ideology and Behavioral Motivations**

Lastly, we turn to Gray’s behavioral motivation systems, the behavioral inhibition system and the behavioral activation system. This is an active test of my hypotheses in this chapter, where I expect conservatives to have more self-reported inhibition compared to liberals. Utilizing Carver and White’s (1994) scale, we compare how much behavioral inhibition and activation is self-reported by liberals and conservatives in the sample.

Figure 8. Behavioral Inhibition and Two Measures of Ideology.



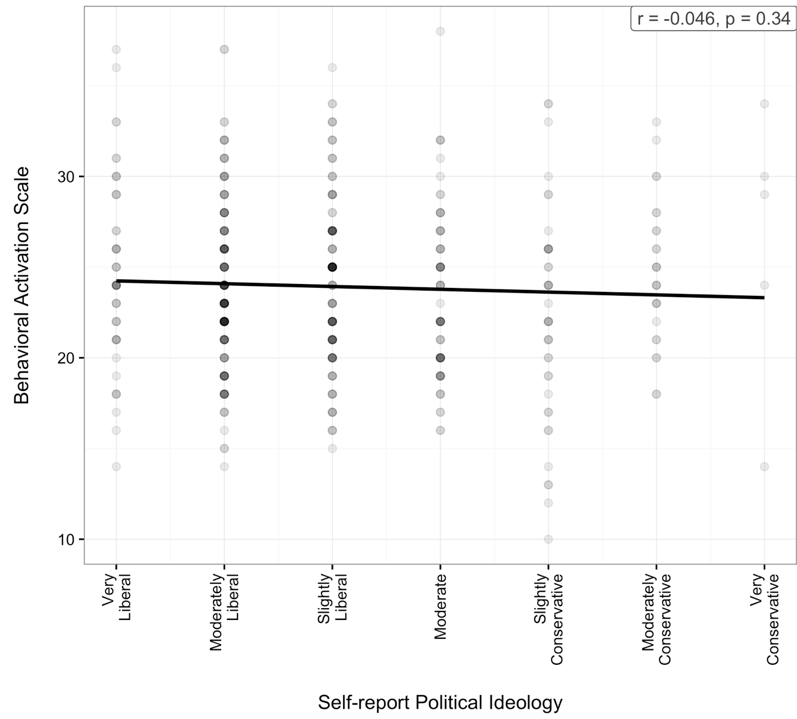


We observe a modest negative correlation between behavioral inhibition and political ideology, with conservative participants reporting less behavioral inhibition. This is precisely the inverse of what we would hypothesize, given the theories of Hibbing and Jost. Contrary to expectations, it is the liberals in this sample who self-report having a disposition towards behavioral inhibition.

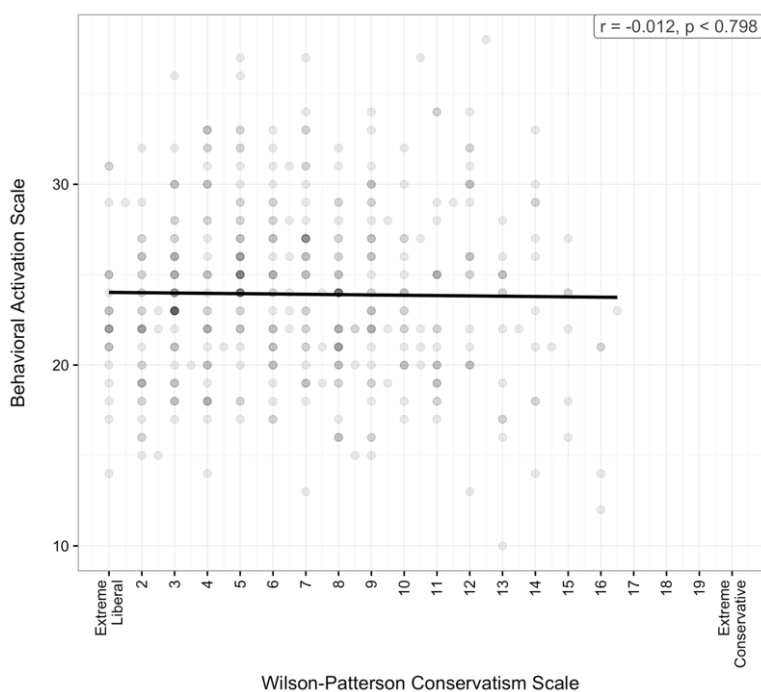


Figure 9. Behavioral Activation and two Measures of Ideology

Ideology is not correlated with behavioral activation scale  
N = 432



W-P ideology is not correlated with behavioral activation scale  
N = 443



For exploratory purposes, we also investigated how self-reported disposition towards behavioral activation may be related to political ideology. As observed in Figure 8, there is a robust null finding for this relationship.

## Discussion

This chapter contributed to the larger dissertation project in two ways. First, this chapter detailed the politics and traits of the larger sample from which experiments in the next two chapters will draw their participants. Second, this chapter explores the correlation between various measures of political ideology and Gray's behavioral inhibition system and behavioral activation systems by way of the Carver and White (1994) questionnaire. Future chapters, which investigate experimental findings from lab

work, have a smaller sample size than what was presented here. Thus, this survey work allows a test of the hypotheses about avoidance motivations and negative affect in a large sample before moving to smaller ones.

The hypothesis for the behavioral inhibition system did not go as expected. Contrary to expectations gleaned from Hibbing and Jost, behavioral inhibition (at least, the self-report) appears to be associated with political liberals in this sample. Also, behavioral approach appears unrelated to political ideology. Future chapters will continue exploring these hypotheses by going beyond the survey questionnaire and into the laboratory.

## CHAPTER FIVE

### HEMISPHERIC ASYMMETRY ANALYSIS

This chapter focuses on dispositional differences between liberals and conservatives in terms of their trait avoidance and trait emotional sensitivity. A trait is a relatively stable disposition that gives the individual a propensity to act in a certain way. Our personality is comprised of thousands of traits. We can readily think of examples of personality traits such as careful, trusting, or pessimistic. A more trusting individual has a propensity to trust, independent of context. Traits often lead to behavior, but they are not determinative. They only prejudice behavior, not dominate it. There are many situations where even a trusting person will choose not to trust. All other things being equal, however, a person with the trusting trait would be more likely to trust. Thus, traits are conceptually independent from circumstances. Interactions like context, environment, mood, and stimuli are temporary and fleeting (experiencing a “state”), while the trait is an enduring characteristic of the individual. A state is a temporary experience, while a trait is a core disposition to the individual.

My overarching argument is that approach-avoidance processes and emotional processes need to be better separated in order to distinguish and judge the two mainstream theories of psychological political ideology. As described in an earlier chapter, although both the Motivated Social Cognition Theory and the Negativity Bias

Theory often rely on the same evidence and have common ground, they actually make two separate claims about conservatives. The psychological processes of interest in this chapter are *trait* differences between liberals and conservatives, specifically *trait avoidance* and *trait negative affectivity*. These individual dispositions are related to everyday behavior, and both theories make predictions for how these traits ought to be related to political attitudes. Below I describe the predictions each theory would make for these traits.

Recall that the Motivated Social Cognition theory argues that conservatives are more motivated by needs to reduce uncertainty, ambiguity, threat, and disgust (Jost et al. 2003). Conservatives are sensitive to avoidance signals, and this sensitivity biases how they view the world, turning them towards a politically conservative belief structure. One way to explore conservative sensitivity to avoidance is by using electroencephalography, measuring electrical signals from the scalp. Cognitive neuroscientists believe that frontal hemispheric asymmetry, a pattern of neural activity in the brain, is correlated with avoidance sensitivity. Thus, *trait avoidance* may be a biomarker of being politically conservative.

The Negativity Bias Theory, on the other hand, actually makes a different argument about trait differences between liberals and conservatives. These scholars argue conservatives are more sensitive to negative emotions than liberals, which causes stronger physiological reactions and focuses greater attention on such stimuli (Hibbing

et al. 2014). Thus, the Negativity Bias Theory posits that *negative affectivity* may be a biomarker of being politically conservative.

This distinction between *trait avoidance* and *trait negative affectivity* seems subtle, but it has deep ramifications for what we believe is the psychological origins of political ideology. Trait avoidance is a disposition that moderates tendencies to avoid and withdraw from novel stimuli. Trait avoidance is behavioral, not specifically emotional. A person with strong trait avoidance will have a relatively greater propensity to avoid. This propensity may manifest in myriad ways, such as faster response times to disengage or more awareness or alertness to dangers in the environment. Trait avoidance is a low-level behavioral process, a reaction that insects or small mammals could have. Reacting to smelling a predator or inhibiting the consumption of a piece of bread about to go into your mouth because you see mold are both examples.

This behavior is different than higher order level reasoning. Anticipating the foul mood of a work colleague and deciding to avoid interrupting them for a coffee break may appear to be “behavioral avoidance.” In fact, it may indeed be a kind of behavioral avoidance, in some sense, but it is a far more sophisticated kind of cognitive processing than the prior examples. It is less automatic and less instinctual. Only humans have relationships with work colleagues, and only humans are capable of the higher cognition to anticipate and avoid their foul moods. Behavioral avoidance, as I mean it, is a kind of fundamental reaction that all multi-cell organisms possess and utilize hundreds to thousands of times a day.

While trait avoidance is a motivational proclivity, encouraging *behavior*, trait negative affectivity is an emotional sensitivity, encouraging a *feeling*. Emotions serve the purpose of facilitating behavior, but they are not behavior themselves. Trait negative affectivity is a disposition that enhances tendencies to feel negative affect, giving a tendency to experience a broad range of negative emotions in response to environmental stimuli. A person with greater trait negative affectivity will experience emotions like anger, disgust, and anxiety more regularly than others, and will have relatively more negative affect in response to negative stimuli. Low trait negativity means a person is relatively less affected by negative mood states and negative stimuli. Individuals may have clinical levels of trait negative affectivity, resulting in anxiety, depression, and/or poor self-concept that can interfere with life. Non-clinical populations also have individual variability in negativity sensitivity. For example, two individuals who watch the same sad movie may feel differing degrees of sadness. If one of the individuals felt greater sadness across several sad movies, they may have stronger trait negative affectivity than in the companion. Neither individual is necessarily abnormal in this example. In this case, negative affectivity is simply a characteristic of the person, one of thousands of personality traits.

Trait avoidance and trait negative affectivity overlap in psychological political ideology studies, but they ought to be considered conceptually distinct. Tritt and colleagues argue, for example, “political psychology research may have similarly confounded valence and arousal, leading to the false conclusion that negative valence

per se is associated with conservative political beliefs. The confounded nature of arousal and valence is reflected in Hibbing et al.'s interpretation of experimental, psychophysiological, neurobiological, and personality research" (Tritt et al. 2014, 330). Many negative emotions motivate behavioral avoidance. However, some emotions that are negative are not *avoidant*. Valence (the feeling of positive or negative) and arousal (the feeling, or lack thereof, of energy and attention) have often been confused in emotional studies (see Harmon-Jones et al. 2010; Tritt et al. 2013). Harmon-Jones and colleagues stress the importance of differentiating valence from arousal: "By exploring the cortical regions underlying emotion processes, the research has suggested the importance of delineating emotional experience from emotional expression and *emotional valence from motivational intensity and direction*" (Harmon-Jones et al. 2010, 459, my emphasis added).

One important case study might illustrate this point. Consider the emotion of anger, an important discrete emotion that both theories fail to consider fully. If considered more fully, in fact, the two literatures would have opposing hypotheses about political conservatives. Anger is a negative emotional state that motivates approach behavior like yelling, hostility, confrontation, and even violence (Ekman & Friesen 1975; Plutchik 1980; Berkowitz 1993; Blanchard & Blanchard 1984; Lagerspetz 1969). Harmon-Jones and colleagues believe "the valence of the emotion may be separable from the motivational direction of the emotion, so that negatively valenced emotions such as anger can be approach motivating" (Harmon-Jones et al. 2010, 459).



The Motivated Social Cognition theory predicts conservatives to be *avoidant*, and therefore would predict conservatives to have less trait anger than liberals because anger is related to *approach*. In contrast, the Negativity Bias Theory posits that conservatives are sensitive to *trait negative affectivity*. As anger is a negative emotion, the theory predicts that conservatives have more trait anger than liberals. The theories are at crossroads on anger, and this example illuminates the motivation of this study to examine trait avoidance and trait negativity affectivity individually.

Interestingly, both theories mostly avoid discussions of anger, not integrating it directly with their respective theories, nor discussing anger as a division point between Motivated Social Cognition Theory and Negativity Bias Theory. In fairness, of course, studying psychological anger as a discrete emotion is very new to political science (but see Ryan 2012). In fact, the study of discrete emotions in political science is itself fairly new (but see Hatemi et al. 2013; and Clifford and Wendell 2015). Hibbing and colleagues (2014) include only a glancing mention of anger, in passing, and without data or consequence to their argument. They write, “when ‘emotionally ambiguous’ faces are shown to research participants, individuals on the political right are more likely to report that the face is expressing a threatening or dominant emotion, such as anger.” The word anger is otherwise absent from the rest of the article. Consequently, anger is not given full consideration in the theory, or distinguished from other negative emotions. Jost et al. 2003 give a similar treatment to anger. Anger is mentioned in a subheading (361), but merely lumped alongside fear and threat. Grouping anger with fear and threat is

problematic because while all are negative emotions, fear triggers behavioral *avoidance* while anger triggers behavioral *approach*. These discrete emotions have the same negative valence, but they motivate completely different behavior. Furthermore, the evidence marshaled by Jost and colleagues is exclusively about reacting to fear and threat (361). There is no direct reference to anger as anything other than a synonym of feeling threat, and no data exploring the relationship of anger to ideology whatsoever. Also, arguably, the link between anger and ideology that they explore is in the specific context to Right Wing Authoritarianism and parenting styles (and, so, not emotional anger, nor broad political conservatism) (Jost et. al 2003, 347; see also Jost et al. 2009).

The discussion above on anger risks being taken as simply a cheap shot against two big targets—is it not unfair to take criticism to these seminal works simply because they have left work to be done? Let me be especially clear about why this discussion of anger matters to the present work. Anger specifically illustrates the potential problems with conflating emotional valence for behavioral motivations in psychological work. Anger has a negative valence, and yet, also encourages behavioral approach, unlike most other negative emotions. But, more importantly, the discussion of anger is *also* serving as an illustration of the broad consequences of being too vague about the underlying psychological factors that contribute to political ideology.

Right now, as paradigmatic and ground-breaking as they are, the theories rely on much of the same literature but Motivated Social Cognition interprets conservatives as avoidant, while the Negativity Bias Theory interprets conservatives as sensitive to

negativity. Neither theory has taken up the challenge of sorting out whether these conservatism effects are (a) behavioral avoidance, (b) negative affectivity, (c) both, or (d) neither. It is time to dig in deeper into these parallel claims. I argue that trait avoidance and trait negative affectivity are two different psychological dispositions, and this chapter is an opportunity to evaluate both theories on their own appropriate claims.

Thus, it is clear that investigating the theories based on their claims of conservative dispositions requires two different (but related) investigations. I argue that testing baseline dispositional differences is an important way to draw contrasts between the two theories, in an attempt to understand better these psychological differences between liberals and conservatives. Motivated Social Cognition needs to test *trait avoidance*, as it posits that conservatives have more trait avoidance. Negativity Bias Theory needs to test *trait negative affectivity*, as it posits that conservatives have more sensitivity to negative affect. This chapter tests these theories in two ways: first, we examine a dispositional difference in resting brain activity that has been linked to trait avoidance, and second, we compare dispositional differences in trait-based negative affectivity.

### **Frontal Asymmetry and Trait Avoidance**

Cognitive neuroscientists have used trait frontal hemispheric asymmetry for more than 25 years to investigate approach and avoidance sensitivities in human beings. Today, some of the seminal papers on trait frontal hemispheric asymmetry from

Davidson and colleagues have over 900 citations (Sutton and Davidson 1997, Davidson 1992). Coan and Allen, writing in 2004, report that the relationship between cortical asymmetries and emotion had already been established by over 70 studies (2004, 7). In their metareview, they establish that resting levels of neural activity in the prefrontal cortex appear to be correlated with trait predispositions towards emotions and behavioral motivations. “Findings from numerous studies reflect an emerging consensus that relatively greater trait left frontal activity is associated with trait tendencies toward a general appetitive, approach, or behavioral activation motivational system, and that relatively greater trait right frontal activity is associated with trait tendencies toward a general avoidance or withdrawal system” (Coan and Allen 2004, 11). Below I describe these findings, and then turn towards how it may be useful in evaluating the Motivated Social Cognition Theory and the Negativity Bias Theory.

Very early in the study of hemispheric asymmetry—indeed, of all neuroscience—researchers connected hemispheric activity patterns with emotions. Over 70 years ago, World War I soldiers with damaged right or left anterior cortices were discovered to have differing experiences with positive and negative affect (Goldstein 1939). Subjects with lesions to the left frontal region (leaving the left side malfunctioning and the right side intact) were more likely to exhibit depression symptoms (Black 1975, Gainotti 1972; Robinson and Price 1982).

These earlier efforts with clinical populations eventually led to research on normal populations, too. Measuring electroencephalography, Tomarken et al. (1990),

found that subjects with greater resting right frontal activity responded with more intense negative affect to negatively valenced film clips, particularly those involving fear or threat. Tomarken and colleagues later proposed that trait positive affect is associated with greater left than right frontal cortical activity, whereas trait negative affect is associated with greater right than left frontal activity (Tomarken et al., 1992). Another study using film clips similarly revealed that having more right frontal activity led to more intense reports of negative affect, and having more left frontal activity led to more intense reports of positive affect (Wheeler et al. 1993).

The relationship between hemispheric asymmetry and emotional sensitivity had early support, but is now challenged by contemporary research. Indeed, these early findings were real, but new research clarified that emotional affect may have been a confound. Davidson and colleagues (1993, 1998a, and 1998b) pushed the study of hemispheric asymmetry away from positive and negative affect, instead suggesting that hemispheric asymmetry corresponded with an approach-avoidance system, a hallmark of Gray's theories of BIS/BAS behavioral motivation. Several follow-up studies by Davidson and colleagues confirmed the relationship (e.g. Reuter-Lorenz and Davidson, 1981; Sutton and Davidson 1997; Davidson 2004). Harmon-Jones and colleagues also found support for the approach-avoidance theory, noting that "past research had essentially confounded emotional valence with motivational direction, and researchers were claiming that relatively greater left than right frontal cortical activity reflected greater approach motivation and positive affect, whereas relatively greater right than

left frontal cortical activity reflected greater withdrawal motivation and negative affect” (Harmon-Jones et al. 2010, 454-455). Davidson’s findings have been empirically verified by a number of different research groups (e.g., Carver and White 1994; Coan and Allen 2003, 2004; Harmon-Jones and Allen 1997, 1998; Amodio et al. 2008).

The consensus in this literature is that relatively greater right frontal activity is associated with tendencies toward behavioral avoidance, instead of emotional affect (Coan and Allen 2003a; Coan and Allen 2003b; Davidson 1993; Harmon-Jones and Allen 1997, Sutton and Davidson 1997, Davidson 1998a,b; Harmon-Jones et al. 2010). Other researchers have confirmed this relationship. For example, Field et al. (1995) and Fox et al. (1996) found evidence that children with greater right frontal activity at rest were more inhibited socially, and scored lower on social competency. Schmidt and Fox (1994) found a relationship between low adult sociability and relatively greater right frontal activity. Schmidt et al. 1999 found shyness had greater right frontal activation.

All of these studies from developmental psychology researchers suggest a relationship between avoidance and right frontal activity. Davidson's approach/withdrawal motivational model of emotion also proposes that left frontal activity (either as state or as trait) indicates a propensity to approach or engage a stimulus, while relatively greater right frontal activity indicates a propensity to withdraw or disengage from a stimulus. Yet, as described above, testing the avoidance motivations of conservatives would appear to be a significant part of the larger project of the Motivated Social Cognition Theory. (Also, it is worth mentioning that the

Negativity Bias Theory may also be interested in these results, given that while emotion is technically a confound in these hemispheric studies, it can still be instructive because most avoidance motivations are, in fact, triggered by negative emotions.) Consequently, frontal EEG asymmetry promises to be a useful tool for studying avoidance sensitivity in political liberals and conservatives. To date, no study has looked at resting hemispheric data to evaluate whether liberals and conservatives have more approach or avoidance sensitivities. This chapter thus fills a lacuna in the psychological study of political ideology.

### **PANAS-X and Sensitivity to Negative Emotion**

To examine trait differences in how liberals and conservatives experience emotion, we will need to use a tool designed specifically to evaluate trait (not state) emotions. Recall that this chapter focuses on trait dispositions, or the characteristic propensity to feel an emotion independent of context. We are interested in trait negative affectivity, not the effect of putting subjects in a negative state condition. One method of operationalizing trait negative affectivity is by having participants self-report how often they experience these emotions in their last few weeks. The Positive and Negative Affect Schedule (PANAS) is a scale developed by Watson and colleagues (Watson et al. 1988; updated to PANAS-X in Watson and Clark 1994) to measure positive and negative affect in contextual (state) and characteristic (trait) ways. The scale is extremely popular in psychology and has more than 17,000 citations. As a trait measure, PANAS-X has been shown to be significantly correlated with corresponding judgments

made by well-acquainted peers (Watson and Clark 1994, 19). Self-reporting a negativity bias, for example, was correlated with peers claiming that you were sensitive to negativity. Additionally, test-retest scores were strongly consistent, and PANAS-X scores were significantly correlated to weekly mood ratings in a sample of 239 undergrads studied for a minimum of seven weeks (Watson and Clark 1994, 19-20).

Before continuing, what exactly is positive and negative affect? Positive affect represents the extent to which an individual feels enthusiastic, active, and alert (Watson et al. 1988). Higher positive affect is a state of full energy, concentration, and pleasing engagement, whereas low positive affect is characterized by lack of energy and sadness (Watson et al. 1988). Negative affect is the extent to which a person feels general distress and unpleasant engagement. It includes mood states such as anger, contempt, disgust, guilt, fear, and nervousness, while low negative affect is a state of benign calmness (Watson et al. 1988). It is worthwhile to note here that positive affect and negative affect are theoretically (with empirical justification) thought of as separate emotional factors or dimensions (Watson and Clark 1994). An individual could have a strong trait of positive affect *and* a strong trait of negative affect, together. This individual would be a (relative) roller-coaster of emotion—higher highs and lower lows—compared to someone with low affect in both dimensions. For example, the Negativity Bias Theory states that conservatives are more trait negative. This does not *axiomatically* mean the theory would *also* posit that conservatives are less trait positive.



The dimensions are largely independent from each other (Watson et al. 1988, 1064; Watson and Clark 1994, 1-3)

As the Negativity Bias Theory posits that conservatives are more sensitive to negative affect, it can be tested via the PANAS-X scales. Although the Motivated Social Cognition Theory ultimately makes a different claim than conservatives have more negative affect, the results of this study would still prove useful to that study. Affect and behavioral motivations have much in common, even though they are commonly conflated.

### **Hypotheses**

Thus, the two major theories of psychological political ideology have predictions for trait dispositions related to avoidance and negativity bias (see Table 4, below). Concerning frontal hemispheric asymmetry and *trait avoidance*, the Motivated Social Cognition Theory posits that conservatives should have greater right-side asymmetry, reflecting a greater sensitivity to avoidance compared with liberals (**H1**). The Negativity Bias Theory agrees that conservatives should have more avoidance sensitivity, but as I have argued, this is technically confounding avoidance sensitivity for negativity bias. Consequently, a better test of the negativity bias would be measuring *trait negative affectivity*. The Negativity Bias Theory predicts that conservatives should have more trait negative affectivity than liberals (**H2**). Additionally, in terms of the discrete emotion subscales, the Negativity Bias Theory predicts that conservatives should have more trait fear (**H3**) and trait sadness (**H4**) than liberals. Again, the Motivated Social

Cognition Theory does not necessarily dispute **H2, H3, or H4**. After all, there is substantial overlap between trait avoidance and trait negative affectivity. However, interestingly, we can use trait hostility (anger) as a differentiator between the theories. Anger is both affectively *negative* but motivationally *approaching*, where the other emotions are affectively *negative* and motivationally *avoiding*. Motivated Social Cognition Theory predicts conservatives should have *less* trait hostility (anger) than liberals, while Negativity Bias Theory predicts conservatives should have *more* trait hostility (anger) (**H5**).

Both theories remain agnostic about positive emotion scales. As mentioned above, positive and negative affect sensitivity are independent from each other (positive affect is not simply the absence of negative affect, but instead is its own emotional dimension). Although Hibbing and colleagues (Dodd et al. 2012) find that liberals have increased sensitivity to *positivity* compared to conservatives, this finding is not emphasized or explored in Hibbing et al. 2014, the foundational paper of the Negativity Bias Theory of political ideology, and so is not emphasized here, either.

Table 4. Disposition Hypotheses.

	<b>Motivated Social Cognition</b>	<b>Negativity Bias Theory</b>
<b><u>Trait Avoidance</u></b>		
<b>H1. Conservatives have more trait avoidance</b>	Yes	Yes
<b><u>Trait Negative Affectivity</u></b>		
<b>H2. Conservatives have more trait negative affectivity</b>	Yes	Yes
<b>H3. Conservatives have more trait fear</b>	Yes	Yes
<b>H4. Conservatives have more trait sadness</b>	Yes	Yes
<b>H5. Conservatives have more trait hostility (anger)</b>	<b>No, less</b>	Yes

## Method

### *Participants*

466 adults employed by a large university in the Midwest completed a screening survey of their political attitudes and personality dispositions. Details about this survey are in Chapter Four of the dissertation. Four months later, a subsample of 51 was selected to perform laboratory behavioral experiments. As the original pool was substantially skewed towards liberals, this sample was screened for political attitudes in order to promote political diversity in the sample. The screening was simply a random selection of 20 liberals, 15 moderates, and 20 conservatives, determined by a combination of their self-reported ideology, and the aggregation of their political attitudes on various issues (the Wilson-Patterson scale, detailed in full in Chapter Four). If an invitation was declined or ignored, a new random participant of their group would receive an invitation. Over the next six months, 20 liberals, 14 moderates, and 17

conservatives agreed to the additional testing session and came into the laboratory.

(More detailed political characteristics of this sample are of direct interest to this chapter, and will be described in additional detail below.)

Fifty-one adults (age 24-52 years,  $mean = 30.7$ ,  $sd = 5.8$ ) served as participants (32 female, 19 male). Participants self-described as right-handed (49 selected “somewhat” or “strongly” right-handed). Although it is speculated that handedness may be related to hemispheric asymmetry patterns, and most research consequently selects right-handed participants only, differences in handedness have no impact on the findings of this chapter. The testing session averaged less than two hours and 30 minutes, including breaks and capping preparation (described below). Participants completed four tasks during the session, and had short breaks of 5 minutes between tasks. Participants were permitted to stand up and/or leave the testing room, but were encouraged to avoid doing so because of the tedious capping process. As it happens, no participants left or required to be recapped during their testing session. Participants were compensated at a rate of \$20/hour, with a minimum payment of \$40 and a maximum of \$50 for the session.

### *Procedure*

After arriving at the laboratory, participants were briefed on the tasks, and asked to sign consent forms. Electroencephalography requires wearing a tight fitting cap that includes a set of sensor nodes for reading electrical signals from the scalp. The capping process requires between 20-40 minutes of preparation time, as electrode nodes are

first gelled with a saline solution to increase conductivity, then snapped into the cap one at a time, and then finally the readings system is tested. The electrodes do not break the skin or provide any discomfort to the participants. While being capped, but before the experiments began, participants completed a brief questionnaire about personality as well as the PANAS-X trait and state emotional batteries (Watson and Clark 1994). Participants first completed three tasks and had several breaks for approximately 110 minutes. Then, they began the resting electroencephalography task that is the subject of this chapter. Resting electroencephalography, a reading of electrical signals from the scalp while the participant was at rest, was recorded while participants sat quietly in a sound-attenuated room for an 8-minute resting period (alternating one minute blocks of eyes-open and eyes-closed in a counterbalanced pattern, as is the convention). The activity lasted about 10 minutes in total, and it was the final activity completed by participants before they were dismissed from the session.

### *Measuring Alpha Asymmetry*

Resting alpha waves were collected in a 64 channel system designed by Biosemi. Alpha waves are one variety of brain waves that can be detected by electroencephalography. Alpha waves appear to originate from the occipital lobe during an awake, but resting, state. According to Coan and Allen, “evidence suggests that activity within the alpha range (typically 8–13 Hz) may be inversely related to underlying cortical processing, since decreases in alpha tend to be observed when underlying cortical systems engage in active processing” (Coan and Allen 2004, 9). The

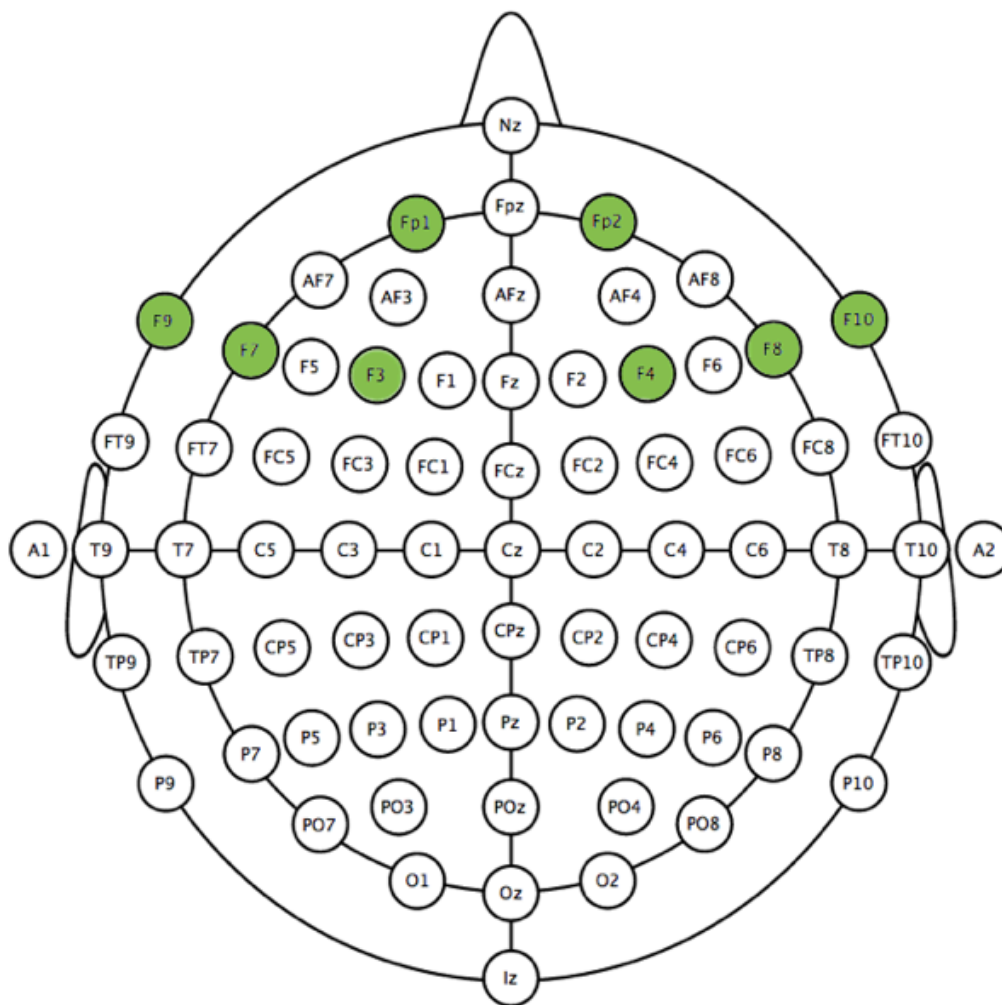
detection of *more* alpha waves, thus, represents *less* cortical processing. Measuring alpha is therefore an indirect way to measure cortical processing. As our goal is to assess the degree to which one hemisphere may be more active while at rest, like all other frontal asymmetry researchers, we need to measure alpha waves in order to infer cortical activity.

Alpha was collected in the frequency range between 8-13 Hz, in 0.5 Hz bands. The raw data was collected by the Biosemi system (compiled in a BDF file format for each participant) and manually checked for eye movement artifacts using BESA Research, Windows-based software designed to analyze digitally recorded EEG. Electroencephalography is hyper sensitive to muscle movements, and the slightest twitch of the eye can result in a noticeable data artifact which needs to be removed from analysis (as individuals have different propensities to blink). In order to reduce volume conduction contributions to EEG, data were transformed to a current source density (CSD) Laplacian 27- channel virtual montage (Allen & Reznick, 2015; Stewart et al., 2014). The application of a CSD montage has been recommended to yield a stable, localized estimate of frontal alpha (Stewart et al., 2014).

One challenge for comparing results between labs is keeping consistent electrode placement, and only careful work in the lab with measuring tape can minimize these differences between subjects. Another complication is that different EEG systems today use varying electrode node schemes over time, with most systems today having 32, 64, or 128 channels. Consequently, researchers use *virtual channels* to allow

comparison of results between labs. Whether EEG signals are measured with a 32, 64, or 128 channel system, software can be used to convert these measurements to a common cranial mapping system called the 10-20 system. Thus, our 64 channels of recorded data were converted to virtual channels corresponding to the traditional 10-20 system, thus allowing comparison to other asymmetry literature. 10-20 refers to the fact that the actual distances between adjacent electrodes on the scalp are either 10% or 20% of the surface area, creating a spreading pattern where electrodes are equidistant from each other.

Figure 10. The 10-20 System and Hemispheric Asymmetry.



*Note: Colored nodes are the electrodes used to compute frontal cortical hemispheric asymmetry*

As observed in Figure 10, each site has a letter to identify the lobe (Frontal, Temporal, Parietal, or Occipital) or to signify that it is Centrally located. Numbers are used with the letters to designate the hemisphere location, with even numbers on the right and odd numbers on the left. A "z" (zero) is used for an electrode on the midline.



The codes “A”, “Pg” and “Fp” identify the earlobes, nasopharyngeal and frontal polar sites respectively.

The first step of capping correctly is to note two anatomical landmarks: first, the nasion which is the distinctly depressed area between the eyes, just above the bridge of the nose; and second, the inion, which is the lowest point of the skull from the back of the head and is normally indicated by a bump. From these landmarks, researchers can determine the sizing of the cap, and the placement of the cap on the head, to ensure that electrical nodes are consistently arranged from subject to subject.

Electroencephalography data needs to be referenced (all signals recorded are necessarily relative, and so there is need for a base reference). In this system, all sites were referenced to the mastoids. To filter electrical interference from the signal, a band filters of 0.01 Hz and 60 Hz was applied, as is standard convention. Cortical hemispheric asymmetry is measured with frontal electrodes (placement of these electrodes are noted with color). Following conversion to the virtual channels, amplitudes were natural logged by site, and then asymmetry scores were calculated the conventional way (see Coan and Allen 2004), by subtracting the left score from the right score at each frontal node pairing (FP2 – FP1, F4 – F3, F10 – F9, and F8 – F7). The original idea for creating a difference score comes from the theory that the two hemispheres inhibit each other, so a greater *difference* in resting state scores suggests one hemisphere is more dominant (and there are approach-avoidance consequences for this dominance). The subtraction also takes into account individual differences in skull mass or other physical factors,

creating a metric that accounts for the *relative* asymmetry of that individual. After the creation of the node subtractions, all four were averaged into an aggregate frontal asymmetry subtraction score.

Table 5. Frontal Asymmetry Score Interpretation.

Frontal Asymmetry Score	Alpha Waves	Neural Activity	Behavioral Motivation Implication
Negative	More alpha on left side	Right hemisphere more active	Avoidance Sensitivity
Zero	Equal alpha on both sides	Equally active sides	No relationship
Positive	More alpha on right side	Left hemisphere more active	Approach Sensitivity

For the remainder of the chapter, we will use the frontal asymmetry score to measure and discuss the findings of this experiment. Table 5 summarizes interpretation. The frontal asymmetry score represents the relative activity of the right and left hemispheres, with a score of zero meaning symmetrical activity. In interpreting this scale, a positive frontal asymmetry score means more alpha waves on the right-side, more left frontal activity, and increased approach sensitivity. A negative frontal asymmetry score means relatively more alpha waves on the left-side, more right frontal activity, and increased avoidance sensitivity.

### *Measuring Trait Emotions*

The PANAS-X revised scale was administered to all participants in order to assess the degree to which they are sensitive to emotions. PANAS-X questions allow emotional sensitivity to be assessed dimensionally—positive affect and negative affect. Each participant uses a five point scale to self-report how much they have felt a discrete emotion over the past couple of weeks (trait), or how much they feel it now, in the

moment (state). A total of 30 discrete emotion items are included (see appendix for full list).

Positive affect and negative affect are themselves comprised of a factor structure of discrete emotions. In their creation and analysis of the PANAS-X scale, Watson and Clark (1994) identify a number of subscales for each affective dimension. Positive Affect is comprised of Joviality, Self-Assurance, and Attentiveness. Negative affect includes Fear, Hostility, and Sadness. A summary of the two dimension scales, the six discrete emotion subscales, and the individual emotion items that comprise each scale is included in Table 6.

Table 6. PANAS-X Scale Compositions

**General Dimensional Scales**

Negative Affect	afraid, scared, nervous, jittery, irritable, hostile, guilty, ashamed, upset, distressed
Positive Affect	active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong

**Basic Negative Emotion Scales**

Fear	afraid, scared, frightened, nervous, jittery, shaky
Hostility	angry, hostile, irritable, scornful, disgusted, loathing
Sadness	sad, blue, downhearted, alone, lonely

**Basic Positive Emotion Scales**

Joviality	happy, joyful, delighted, cheerful, excited, enthusiastic, lively, energetic
Self-assurance	proud, strong, confident, bold, daring, fearless
Attentiveness	alert, attentive, concentrating, determined

*Note. Adapted from Watson and Clark, 1994, "The PANAS-X: Manual for the Positive and Negative Affect Schedule - Expanded Form"*

As can be observed in Table 6, discrete emotions are aggregated into two general dimensional scales, negative affect and positive affect. For example, fear, hostility, and sadness are all negatively valenced discrete emotions, while joviality, self-assurance, and attentiveness are all positively valenced discrete emotions. An individual

with greater trait negative affectivity would be expected to react more strongly to negative emotions, and would do so independently from state-based contextual factors, such that would *trigger* an emotional response. If two people both had an emotional response triggered by the environment, the one with greater trait negative affectivity would be expected to react more strongly to that trigger, all else being equal. PANAS-X also allows the creation of several subscales of interest, as well. As noted above, discrete emotions like fear, hostility (anger), and sadness are commonly invoked by the Negativity Bias Theory and other emotion researchers working in political psychology.

#### *Measuring Ideology*

Political ideology questions were asked to all participants several weeks prior to the laboratory experiment. Below are the five ways ideology was measured in this sample, and the samples distributions on those scales. Cronbach's alphas reported in subsequent paragraphs are from the full survey sample of 466 participants, as alphas from the smaller sample of 51 include more random variability and are not as conceptually useful. That said, alphas from the smaller sample did not differ in a meaningful way from the numbers reported below. Other details about the scale construction and measure validity are described in Chapter Four.

Table 7. Descriptive Statistics of Lab Participants.

	n	mean	sd	median	min	max	range	skew	kurtosis	se
self-report ideology	49	3.31	1.65	3	1	6	5	0.09	-1.4	0.24
Wilson-Patterson (Full)	51	6.94	3.82	7	0	14	14	-0.07	-1	0.54
Wilson-Patterson (Economic Conservative)	51	2.04	1.33	2	0	4	4	-0.12	-1.14	0.19
Wilson-Patterson Social Conservative)	51	2.41	2.12	2	0	7	7	0.43	-1.06	0.3
World Values Survey Economic Justice Scale	51	21.16	7.4	24	0	34	34	-0.46	-0.27	1.04

Self-reported ideology is the conventional seven-point scale used by the American National Election Studies, spanning “Very liberal” (1) to “Very conservative” (7) with “Moderate” (4) being the middle anchor. Liberals range from 1 to 3, moderates are 4s, and conservatives range from 5 to 7. Although some literature has pointed to interesting alternatives for self-reports (Wood and Oliver 2012), this is still the dominant way of measuring ideology in a survey. Also, this scale (and a 10 point variant of it) is used almost exclusively by psychologists doing work in the Motivated Social Cognition Theory area (e.g. Jost et al. 2003, Jost and Amodio 2012).

The Wilson-Patterson scale of political attitudes (Wilson 1968; updated by Smith et al. 2011) is a battery of twenty issue attitude items, which are additively combined into a general conservatism scale ( $\alpha = .80$ ). As ideology is sometimes conceptualized as multidimensional, I also created social conservatism ( $\alpha = .76$ ) and economic conservatism ( $\alpha = .61$ ) subscales based off of the Wilson-Patterson scale detailed above.

A full description of how these subscales were constructed is available in Chapter Four.

In short, however, these two subscales are based on theoretical grouping, and based on general multidimensional work (e.g. Treier and Hillygus 2009). Social conservatism includes school prayer, legal pornography, illegal immigration, death penalty, the Patriot Act, biblical truth, gay marriage, and abortion. Economic conservatism includes welfare spending, tax cuts, small government, and foreign aid. More research needs to be done on the psychological underpinnings of *multidimensional* ideology (Hibbing et al. 2014), and some evidence points to the idea that ideology is not a singular concept (see Chapter Two for more details). It will be useful here to see how social and economic conservatism might differ, and this is an important way that political scientists can improve on the work of psychologists in the study of the psychology of political ideology.

Finally, I used the World Values Survey asks four Likert-style questions about economic justice. (Exact question wording is available in the appendix.) These items have been combined into the World Values Survey Economic Justice battery, which measure attitudes about income redistribution and economic inequality ( $\alpha = .70$ ).

## Results

Table 8. Correlation Matrix of Emotional Measures.

		<i>Ideology Measures</i>				
		Self-reported	Issue Attitudes	Economic Issues	Social Issues	Economic Justice
<i>Psychological Traits</i>	<b>Trait Avoidance</b>					
	Frontal Asymmetry	0.23	<b>0.355*</b>	<b>0.235‡</b>	<b>0.346*</b>	0.1
	<b>Trait Negative Affect</b>	-0.08	-0.157	-0.149	-0.08	<b>-0.294*</b>
	Fear	-0.185	-0.161	<b>-0.239‡</b>	-0.028	<b>-0.356*</b>
	Sadness	0.003	-0.158	-0.067	-0.131	<b>-0.242‡</b>
	Hostility	0.001	-0.034	-0.107	-0.025	-0.072
	<b>Trait Positive Affect</b>	0.1	0.206	0.197	0.15	0.175
	Joviality	0.02	0.141	0.109	0.122	0.131
	Self-assurance	0.139	<b>0.253‡</b>	<b>0.303*</b>	0.176	<b>0.254‡</b>
	Attentiveness	0.158	0.187	0.17	0.108	0.108

\*  $p < 0.05$ ; ‡  $p < 0.10$ . Correlation tests are two-tailed.

Note on ideology scales: higher values reflect more conservatism. Self-reported is the ANES 7 point scale. Issue attitudes is the full Wilson-Patterson scale. Economic and Social issues are Wilson-Patterson subscales. Economic Justice comes from the World Values Survey.

The Motivated Social Cognition Theory predicted that conservatives would have more trait avoidance compared to liberals (**H1**), which is operationalized in this study as a lower frontal asymmetry score. However, I find no significant relationship between frontal asymmetry and self-identified political ideology, and it trends in the opposite direction than predicted ( $r = 0.23$ ,  $p = 0.11$ ). I also find that the Wilson-Patterson conservatism scale is correlated *positively* with the frontal asymmetry score ( $r = 0.36$ ,  $p = 0.01$ ), exactly the opposite of the expectations. This finding also holds for the W-P social conservatism scale ( $r = 0.35$ ,  $p = 0.01$ ), and it trends in the same pattern for the

economic issue subscale ( $r = 0.24, p = 0.10$ ). The economic justice subscale of the World Values Survey, which focuses on liberal-conservative beliefs about economic inequality, is not correlated with frontal asymmetry ( $p = 0.49$ ). Whether ideology is self-reported or survey-determined, there is no evidence that conservatives have more trait avoidance based on frontal asymmetry measures. If anything, these results suggest *liberals* have the neural correlates for having more trait avoidance.

What about trait sensitivities to negative emotions? No statistically significant relationship was found between self-identified conservatism and trait negative affectivity (**H2**) ( $p = 0.59$ ). No statistically significant relationship was found between the Wilson-Patterson ideology scale ( $p = 0.27$ ), the W-P social conservatism subscale ( $p = 0.58$ ), or the W-P economic conservatism subscale ( $p = 0.3$ ). The World Values Survey Economic Justice scale does have a surprise negative correlation to trait negative affectivity ( $r = -0.36, p = 0.01$ ), which suggests that more trait negative affectivity is correlated with political liberalism (not with conservatism, as was expected).

Trait fear appears mostly unrelated to political ideology, with a trending finding on economic conservatism, and a statistically significant relationship on the World Values Scale, where once again the relationship directions are *contrary* to theoretical expectations (**H3**). Self-reported ideology ( $p = 0.20$ ), W-P scale ( $p = 0.26$ ), or W-P social conservatism ( $p = 0.84$ ) yield no relationship. Again, the Wilson-Patterson subscale for economic conservatism trends towards having a relationship to trait fear, but in precisely the opposite direction than expected ( $r = -0.24, p = 0.09$ ), with it being



associated with political liberalism. Economic conservatives in this sample may have moderately *less* trait fear sensitivity.

Trait sadness (**H4**) and trait hostility (**H5**) have essentially no relationship to any measurement of political ideology in this sample ( $p$  values range from 0.27 to 0.95 for both trait sadness and trait hostility, see Table 8). Early in this chapter, I mentioned that trait hostility (anger) may prove to be an interesting dividing point between the Motivated Social Cognition Theory and the Negativity Bias Theory, but as it turns out, both theories fail their hypotheses here.

Although both theories are agnostic about the relationship of political ideology to positive affect, we have the data to explore. First, recall that Watson and Clark 1994 posited trait negative and positive affectivities ought to be considered separate dimensions (and not two sides of the same construct). In this data, I find that the two characteristics are only weakly negatively correlated ( $r = -0.26, p = 0.06$ ), confirming their research. Second, in terms of the relationship of trait positive affectivity to political ideology, I find rather strong evidence of no relationship whatsoever (see Table 8). One correlation manages to catch, as economic conservatives have more trait self-assurance ( $r = 0.30, p = 0.03$ ). We should be careful about extrapolating too much on that finding, given that it was precisely one significant result of twenty tests (exactly 5% of the tests) of trait positive affect. Self-assurance has two trending relationships, both in the opposite direction to expectations.

## Discussion

This chapter focuses on ideological differences in trait avoidance and trait negative affectivity. These individual dispositions are related to everyday behavior, used by human beings from dozens to hundreds of times a day. We investigate the claims of the Motivated Social Cognition Theory and the Negativity Bias Theory, being especially sensitive to the idea that the theories subtly posit different psychological undercurrents for political ideology (albeit, processes that are quite related).

Recall the Motivated Social Cognition theory argues that conservatives are more motivated by needs to reduce uncertainty, ambiguity, threat, and disgust (Jost et al. 2003). Conservatives are thought to be sensitive to avoidance signals, biasing their beliefs towards political conservatism. I use frontal hemispheric asymmetry to test the idea that trait avoidance may be a biomarker of being politically conservative.

The Negativity Bias Theory, on the other hand, argues conservatives are more sensitive to negative emotions, causing stronger physiological reactions to negativity (Hibbing et al. 2014). I used a battery of survey questions that tap into emotions to test the idea that trait negative affectivity may be a biomarker of being politically conservative.

The results are surprising in every possible way. The data show there is virtually no evidence that liberals and conservatives hold trait differences in trait avoidance or sensitivity to negative emotion. In fact, if anything, liberals in this sample appear to be more sensitive to avoidance, which stands out from the vast majority of political

psychology work on this subject. Where I had hoped to contribute by parsing out two different psychological processes (behavioral motivations like avoidance from negative affect) in order to clarify our two main theories, instead I fail to find evidence that supports either theory.

Overall, ideology was measured in five ways, and in no form of measurement is there a relationship between trait emotional sensitivity and ideology. These results urge caution moving forward for both psychological theories of political ideology, and begs further work to establish where the psychological differences noted by Jost, Hibbing, and colleagues are emerging. Those results have strong support over dozens of papers, yet, my work here does not support their claims. The next chapter continues the investigation of how avoidance sensitivity and negativity bias may be different between liberals and conservatives.

## CHAPTER SIX

### GO/NO-GO BEHAVIORAL INHIBITION ANALYSIS

This chapter expands our investigation of dispositional differences between liberals and conservatives by looking at conflict monitoring in the brain. Conflict monitoring is the cognitive process that helps resolve issues between goal directed behavior and our ever changing environment, allowing us to detect potential conflicts and facilitate behavior to resolve detected conflicts. Conflict monitoring is part of a behavioral surveillance system, with the central purpose of resolving a conflict between desired outcomes and a habituated response.

Conflicts between goals and ongoing behavior occur regularly in human experience. For one silly—but instructive—example, consider the children’s game, Red-Light-Green-Light. In the game, one child plays as the Stop-light and the rest are at a starting line some distance away. The game begins when the Stop-light yells, “Green light!” At this cue, the children at the starting line race towards the Stop-light at high speed. However, at any time, the Stop-may call out, “Red light!” which forces the children to immediately halt moving. Children who cannot successfully stop are removed from that round of the game. As the game continues, the Stop-light alternates between calling for green light and red light in an attempt to get the dashing kids to make errors and drop out of the game. The first child to tag the Stop-light without

violating the red light signal is the winner. The Stop-light wins if they can successfully force errors in all the runners, leaving no runners remaining on the field.

What makes Red-Light-Green-Light difficult for children (and their 32 year old uncle) is that the players have a common goal that is difficult to achieve. They want to be the first to touch the Stop-light, which is accomplished by running more quickly than the other players. However, the runners must simultaneously monitor changing signals in the environment to stay “safe” in the game. Failure to stop immediately after the red light signal results in disqualification. A runner in this game needs to be goal-directed, but also needs to remain constantly aware of changing signals in the environment. And, if your niece really wanted to see her uncle out of the game, she could yell out, “Green lightning!” which falsely impersonates a green light signal to begin running again. (Do not underestimate the strategic shrewdness of your nieces.) To succeed in this game, you need constant surveillance paired with fast footwork. The challenge of the game is in successfully reaching your goal rapidly while being alert to unexpected signals that threaten immediate failure.

Red-Light-Green-Light is a metaphor for conflict monitoring in animal behavior. We are constantly engaged in small goal-oriented behavior, while also simultaneously being constantly vigilant for new signals in the environment. Conflict monitoring is a cognitive process that allows humans to detect potential conflicts between behavior and goals as well as instigate new behavior to resolve the conflict. Our conflict monitoring processes are constantly vigilant, and may trigger dozens of times per day, at

many different scales. You reach down for an apple at the grocery store, and place it in your basket. You repeat this twice more. However, when you reach down for the fourth apple, your eyes catch the sheen of dusty green-brown mold. Your goal to place this apple in your basket was interrupted by a new signal in the environment. Conflict monitoring is the process that halts your habituated behavior in response to this new information. Other day-to-day examples are numerous. While briskly walking through a cafeteria towards a vender, you suddenly need to halt because another person walks into your path without seeing you. You might be taking notes during a phone call and realize that the pen you are using has run out of ink, requiring you to shift attention from the phone call to the drawer under your desk for the backup pen. Your conflict monitoring processing is what helps you identify when a shift in attention and behavior may be required, especially in circumstances when the ongoing behavior is prepotent, habitual, or intuitive. We need our conflict monitoring process the most when we are not concentrating or focusing on what we are doing, and the behavior is routine.

Conflict monitoring is broadly categorized by researchers as part of the behavioral inhibition system, which has been a theme of this dissertation. As a reminder from earlier chapters, behavioral inhibition is the system that triggers motivation to halt ongoing behavior in response to the environment, especially concerning negative stimuli and events that cause punishment, frustration, and anxiety (Gray 1982; Gray & McNaughton 2000). The behavioral inhibition system is a broad psychological construct

that involves numerous other cognitive processes, of which conflict monitoring is one example.

This chapter follows recent cognitive psychology work by looking at conflict monitoring in the brain, examining behavioral and neural data responses on a Go/No-Go task. I record electroencephalography to measure how the brain reacts when it detects a conflict between goal and behavior. Our key question for this chapter is: are there individual differences between liberals and conservatives in conflict monitoring processing?

As we will see, only limited attention has been given to the question of whether liberals and conservatives would be expected to have differences in conflict monitoring processes. Much like personality differences, we might expect some individuals to have a stronger conflict monitoring response than others, allowing them to make fewer response errors to simple behavioral tasks. This chapter is a direct replication of a study by David Amodio, John Jost, Sarah Master, and Cindy Yee (2007), which hypothesizes that because liberals are more cognitively flexible, they ought to have stronger conflict monitoring systems. This study, cited more than 350 times, is a seminal contribution to the area of inquiry sometimes called *political neuroscience* (Jost and Amodio 2012), and seeks to bolster and extend Jost's extremely popular theory of conservatism as motivated social cognition. Replication of this study is important because the paper itself is important to the project of biology and politics. When political scientists and political psychologists defend the utility of neuroscience for studying political attitudes,

the Amodio et al. 2007 paper is always cited, and it is sometimes the only such paper cited in a review paper.

Prior chapters in this dissertation have raised more questions about the psychological roots of political ideology than answers—indeed, results so far from this sample have largely *failed* to support the idea of significant differences between liberals and conservatives in psychological factors of root-level emotional sensitivity and approach and avoidance motivations. Chapter Four dealt with self-reported behavioral inhibition and behavioral activation in survey data, finding a few unexpected relationships but mostly a host of null results. Chapter Five moved beyond self-report into an investigation of trait level differences in approach-avoidance and emotional sensitivity by the reading of electrical signals off the scalp in search of brain patterns connected to negative and positive emotions. These results suggested very few differences in emotional sensitivity between liberals and conservatives, which goes against expectations from virtually any researcher working on the political psychology of political ideology. In this chapter, we move past self-reported traits and trait-level neurophysiological patterns, towards actual behavioral data on a behavioral task.

When this chapter closes, we will continue to find a counter-intuitive (but robust) story of no significant psychophysiological differences between liberals and conservatives, this time in the context of conflict monitoring processes during a Go/No-Go task. I also address the replication efforts of two additional studies—one which intended to directly replicate Amodio et al. 2007 as I have done, and one which



collected similar data to Amodio et al. 2007 but did not discuss the implications of their data. Thus, this chapter ultimately looks at all available conflict monitoring in the brain of liberals and conservatives across four sets of researchers. Amodio et al. 2007 are cited frequently, but no review paper has yet looked at the aggregate findings across all four of these research teams.

At the close of this chapter, having reviewed new and old evidence of conflict monitoring and political ideology, I believe the Amodio et al. 2007 findings need more attention from scholars. The original data presented in this chapter, on a sample of 51 non-student adults, do not replicate any part of Amodio et al. 2007 at all. One study (Weissflog et al. 2013) has mixed results for replication, and a second related study (Inzlicht et al. 2009) fails to replicate. Implications of this struggle to replicate this important work are discussed at the conclusion of this chapter.

### **Conflict Monitoring and Executive Functioning**

To think and act, the human brain must engage in several attentional and monitoring behaviors. Cognitive scientists broadly refer to these processes as executive functioning. Executive functioning is a set of cognitive processes that are necessary for the cognitive control of behavior. Executive functioning allows people to identify, pursue, retool, and resolve goal-directed behavior. Some of these executive functions include control of attention, inhibition control, and memory processes. Our capacity to plan, problem solve, and logically reason are all due to our executive functioning. The broad array of executive functions in the brain are tremendously influential on behavior,

and impairment in executive functioning is linked to a suite of cognitive and personality disorders.

Executive functioning is about the control of action, where “deliberate, conscious control of activity is desired rather than those that are automatic” (Norman & Shallice, 1986, 1). Norman and Shallice (1986, 2) posit five types of situations that require deliberate attentional resources:

1. They involve planning or decision making.
2. They involve components of troubleshooting.
3. They are ill-learned or contain novel sequences of actions.
4. They are judged to be dangerous or technically difficult.
5. They require the overcoming of a strong; habitual response or resisting temptation.

In common between these situations is the need to control the response in order to avoid error.

Researchers have classified the cognitive process designed to identify potential response conflict and motivate effective performance to overcome the conflict as conflict monitoring (Amodio et al. 2008; Kerns, 2004). Response conflict is the occurrence of incompatible response tendencies, or an instance where reflexive or habitual response appears to conflict with the individual’s immediate goals. Conflict monitoring, therefore, helps control our control (Kerns, 2004). Conflict monitoring in this dissertation is synonymous with error detection and behavioral conflict detection.

One of many behavioral tasks in psychology labs known to tap into conflict monitoring is the Stroop color-naming task, one of the most famous and important experimental tasks ever devised. In the generic variant of the Stroop, participants view

a printed word that represents a color (e.g. “RED,” or “BLUE”), and they are tasked with speaking the written word aloud. This task is relatively simple during the congruent trials, where the word “RED” is written in red ink. However, incongruent trials are mixed in, where the word “RED” is written in *blue* ink. Incongruent trials require the participant to suppress the reflexive impulse to say the color of the ink in order to correctly say the written word aloud. Participants take longer and makes more errors on incongruent trials because of the increased difficulty.

The Stroop task requires individuals to engage in conflict monitoring. It requires subjects to override a strong, prepotent response in order to accurately complete the trial. Subjects in the Stroop task are habituated to quickly viewing a word and quickly responding by naming a color. Once the prepotent response is established, it requires executive control to step in and inhibit the response. Conflict monitoring is about detecting a potential conflict between goal and behavior, and cuing the brain to attempt to resolve the conflict.

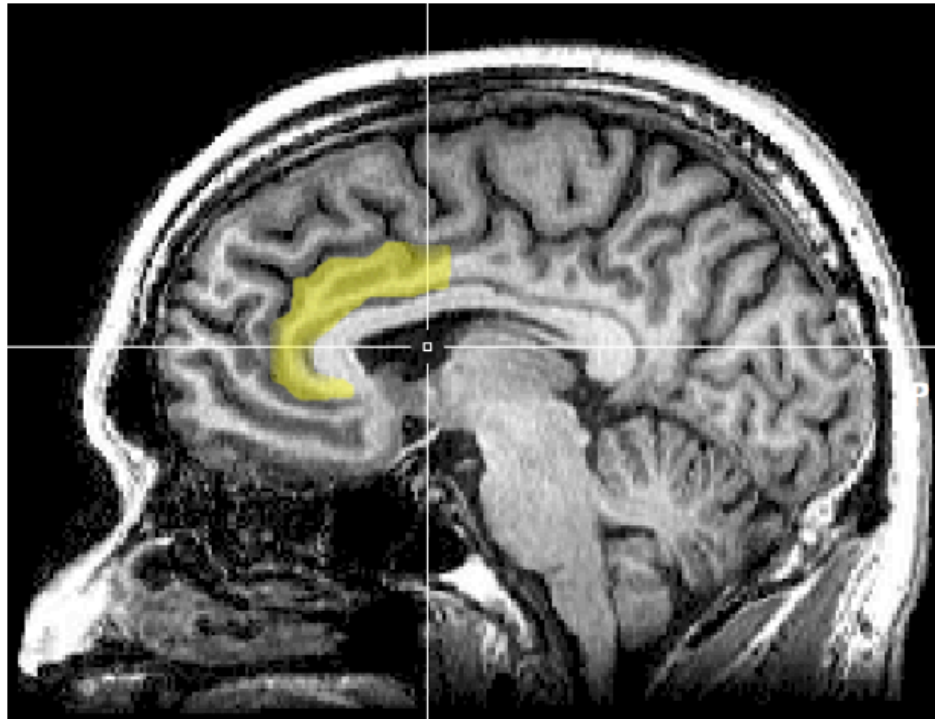
The Go/No-Go task is another behavioral task for measuring individual differences in conflict monitoring. Like the Stroop color-naming task, the Go/No-Go task creates a habitual prepotent response of pressing the “Go” button, which must be unexpectedly inhibited when the rare “No-Go” signal flashes on the screen in place of the “Go” signal. This chapter utilizes the Go/No-Go behavioral task, and more details about the experiment are below.

Although accuracy on the tasks is one reasonable measure of conflict monitoring, researchers have also expanded the scope of their investigation into the neurocognitive mechanisms responsible for conflict monitoring. Cognitive scientists studying the brain have learned that conflict monitoring largely involves the anterior cingulate cortex and the dorsolateral prefrontal cortex (Botvinick et al. 2001; Botvinick et al. 2004; Kerns 2004). Neuropsychological studies of lesion patients have helped demonstrate the importance of ACC related executive function for everyday cognitive and social behavior (Bush et al., 2000; Holroyd & Yeung, 2012). Below, we outline the role of the anterior cingulate cortex as it relates to conflict monitoring in more detail.

### **Anterior Cingulate Cortex and Psychological Processes**

Conflict monitoring involves functions of attention, cognitive control, and memory. Processes like this are virtually never fully isolated to a single brain region. It is important to understand that many regions of the brain are related to emotion and cognition, complexly interweaving many different brain regions. Strict topographical understandings of brain function tend to underestimate the interplay that occurs between many regions in response to a single stimuli. And, of course, region-of-interest studies (necessarily) tend to downplay the role of the whole-brain in favor of the particular region being highlighted and investigated in a particular study.

Figure 11. The Anterior Cingulate Cortex.



Those warnings understood, research has nonetheless demonstrated a consistent special role for the anterior cingulate cortex (ACC) in conflict monitoring and conflict detection. The anterior cingulate cortex is the frontal area of the cingulate cortex, a centrally located region immediately above the corpus callosum (see yellow region in figure). Over the past few decades, researchers have broadly understood that the ACC is related to cognition and emotion in the human brain, with particular specialization in attention and self-regulation (Botvinick et al., 2001; Botvinick et al., 2004; Bush et al., 2000; Kerns, 2004; Van Veen & Carter, 2002). Research also suggests that emotions can moderate and mediate executive action and attention, as well (Kanske & Kotz, 2011).

As research on the anterior cingulate cortex has continued, a picture has been sketched of its particular specialization in emotional and cognitive behavior.

Researchers have found the ACC is particularly active compared to other regions when the cognitive processes involve attention, detecting errors, and self-regulation (Amodio & Frith, 2006; Botvinick et al., 2001; Kanske & Kotz, 2011). Additionally, distinctive ACC activity spikes when individuals engage in top-down control to resolve detected conflicts during information processing (Botvinick et al. 2001; van Veen & Carter 2002).

Researchers also believe that the anterior cingulate cortex has a broad role in directing attention during behavioral tasks in the laboratory. During a computerized behavioral task with an accuracy component, a powerful response in the ACC can be observed when the subject realizes that they have made an error when attempting to be accurate. This error-detection processing appears to originate from the ACC (Gehring et al. 1993), and researchers have also found general conflict-monitoring processing also tied to the ACC (Luu et al. 2003). In theory, the ACC serves an adaptive purpose, helping us recognize errors between our passive behavior and our active goals, particularly if our current habitual behavior needs to be rapidly interrupted in response to new information or a new threat.

Additionally, the ACC has also been connected to modulation of autonomic activity (Devinsky et al. 1995), suggesting a role in subconscious or unconscious behavior direction. Lavin et al. 2013 note that neuro activity generated in the ACC is produced when subjects process conflicting social information, as well as detecting pain. Singer et

al. (2004) and Jackson et al. (2005) linked ACC activity with empathy when viewing pain in others.

The anterior cingulate cortex has also been connected to many related psychological processes, including self-regulation and anxiety. Gray and McNaughton (2000) looked at animal models of mice, lesion studies of human beings, and the known effects of anxiolytic drugs (like Xanax) to formulate their theory of anxiety as an alarm system, with the ACC as a “cortical alarm bell” (pg. 137). The ACC alerts the mind in response to states of uncertainty, simultaneous activation of conflicting goals, and erroneous responding.

Gray and McNaughton 2000 specifically note that abstract conceptual goals are likely to be regulated in much the same way as simple, concrete goals. It should be expected, according to them, that more advanced cognitive processing will follow the same general rules. Anxiety about completing a dissertation follows the same broad neurocognitive rules of anxiety as walking into an ominous cave where predators may be present.

Research continues to confirm the Gray and McNaughton model of anxiety, and the role that the ACC plays in the detection of states that trigger anxiety. The ACC is important for the types of inhibited responding that is characteristic of anxiety (Hajcak & Foti 2008; Hajcak et al. 2003) and for the minimization of prediction errors (Ridderinkhof et al. 2004). A prediction error is when you expected an outcome but you

turned out to be wrong. This concept is highly compatible with the idea of conflict and error detection noted above.

The ACC, thus, is part of the general system for regulating and modifying behavior by signaling when control is needed, usually as a result of some anxiety-producing event such as the commission of an error (Holroyd & Coles 2002), the detection of conflict (Yeung et al. 2004) or the experience of uncertainty (Critchley et al. 2001; Hirsh & Inzlicht 2008).

You can see that researchers are still triangulating the detailed functions of the anterior cingulate cortex, but work so far has demonstrated a number of pathways for how the ACC affects, facilitates, or mediates a particular kind of attentional information processing concerned with making mistakes and correcting behavior. In other words, the anterior cingulate cortex seems to play an especially important role in conflict monitoring.

Below, we turn to the Go/No-Go behavioral task and Gray's dual-systems of behavioral motivation, to try to understand how conflict monitoring is related to Gray's system of behavior inhibition and what this could mean for political ideology.

### **Go/No-Go and Gray's Behavioral Motivation Systems**

The Go/No-Go behavioral task has been used by researchers as a measure of individual differences in behavioral inhibition. In past chapters, I argued that Gray's dual theory of behavioral motivations is potentially important to understanding psychophysiological differences between liberals and conservatives. Below, I sketch an



outline for why Gray's work is relevant to conflict monitoring in the anterior cingulate cortex.

To review quickly, Gray (1982; 1990; Gray & McNaughton 2000) proposed that animals have a behavioral activation system (BAS) that motivates behavior towards goals and a behavioral inhibition system (BIS) that halts ongoing behavior in response to novel or unexpected stimuli. The behavioral activation system is conceptualized as the *go* system, motivating behavior towards the pursuit of goals. Goals, in this context, refer to the hundreds of directed impulses and small plans we have on a daily basis.

Colloquially, we often tend to think of goals as big picture ideas—you have a goal to complete this research paper, or a goal to leave work early enough to walk the dog before dinner. But Gray's definition of goal-directed behavior goes to a much smaller level (we might colloquially think of them as micro-goals). Under this framework, it is considered goal-directed behavior to wheel your rolling office chair over to the phone, so that you can place a call. It is also a goal to pull a tissue from the box to blow your nose. These goals require behavior, and Gray's theory conceptualizes the behavioral activation system as the mechanism for initiating goal-directed behavior.

The problem for us living things is that we cannot pursue these little goals with reckless abandon. Our environmental situation or context can change rapidly without notice, requiring us to change our immediate plans and halt ongoing behavior. For example, your plan to roll the chair over to the telephone needs to quickly be changed when you hear the sharp, distressed bark of the dog underfoot. When you hear the

noise of the bark, or feel the bump of his tail under the chair wheels, you will immediately *halt* your executing plan in reaction to the new information. To inhibit our current intended behavior requires the behavioral inhibition system. You should think of the behavioral inhibition system as being the *stop* mechanism. It halts ongoing behavior, attempts to disengage us from danger, and allows us to create a new behavioral plan in response to the new information.

Simultaneously in our minds, we are engaged in goal-oriented behavior while also keeping persistent surveillance over our changing environment. This is the heart of Gray's dual process system—humans and animals alike have a behavioral activation system that is engaged in current goal-directed behavior while also an active behavioral inhibition system that is quietly surveying the environment for emergent new information.

Now, a critical question has emerged about what behavioral inhibition means in psychological research. Amodio et al. 2008 note, “the primary source of ambiguity concerns whether BIS is associated with the tendency to halt ongoing behavior or to engage in active avoidance behavior in response to a potential threat. On one hand, much research has operationalized BIS in terms of behavioral inhibition, as originally suggested by Gray... on the other hand, many researchers have described BIS in terms of behavioral avoidance” (12). These two conceptualizations of the Gray system— inhibition versus motivational avoidance—are rather different. Behavioral inhibition is the halting of ongoing behavior based on new information—it is the interruption of

action. In contrast, behavioral avoidance is actively avoiding something based on new information—it is the action of avoidance. Behavioral inhibition is about *stopping a plan*, whereas behavioral avoidance is about *starting a plan of avoidance*.

Both functions could be linked to the concept of conflict monitoring as they are related to detecting a conflict, stopping conflictual behavior, and redirecting behavior to avoid the conflict. Still, conceptual clarity is necessary because *stopping a plan* and *starting a plan* could be fundamentally different behavioral motivations, threatening to confuse the underlying psychological mechanisms that we look at in this dissertation. Especially as they intersect with approach-avoidance theories.

Amodio et al. 2008 examine this conceptual confusion directly. Based on a review of the literature, they conceptualize BIS as specifically about inhibition. They argue that Gray's original conceptualization is theoretically more akin to halting ongoing behavior rather than initiating avoidance behavior. Then, using behavioral and electroencephalography measures, Amodio and colleagues find that the BIS self-report (based on the questionnaire from Carver & White, 1994) is correlated with ACC related activity on a Go/No-Go task. This means the BIS self-report is related to an attentional system for monitoring response conflicts. (A deeper discussion of BIS, BAS, inhibition and motivational avoidance is included in Chapter Four.) Additionally, they find that self-reported BIS is correlated with increased error-related negativity in the anterior cingulate cortex when subjects make errors on No-Go trials. In other words, when subjects are supposed to inhibit their button-pressing, but fail to do so, the anterior

cingulate cortex has a sharp moment of activity to reflect the detected error. This further establishes the relationship between Gray's BIS scale and ACC related activity during the Go/No-Go task.

Thus, this chapter considers the BIS system a method of *halting* ongoing behavior, suggesting that it is important or essential to the process of conflict monitoring. Additionally, I conceptualize the Go/No-Go task as a behavioral measure designed to test conflict monitoring in a way consistent with Gray's theories of a behavioral inhibition system. The experiment in this chapter is the behavioral and neural complement to the survey data on BIS in Chapter Four. Below, we complete the literature review by looking at how conflict monitoring in the anterior cingulate cortex, a feature of Gray's behavioral inhibition system, could be related to political ideology.

### **Go/No-Go Task and Political Ideology**

The Go/No-Go task has already been applied to political ideology twice and religious belief once. Before wading in, though, we should pause on what we might expect to find. From the summary of literature above, we understand that conflict monitoring is a general mechanism for detecting when one's habitual response tendency is mismatched with responses required by the current situation. We understand that conflict monitoring is conceptually related to Gray's behavioral inhibition system, a powerful cognitive feature of how we interact with the world on a minute-by-minute scale. We also understand that conflict monitoring is not restricted to autonomic body systems or low-level cognition—it could just as easily be related to

abstract thought. Given the above, how do these processes influence high level abstract thinking, such as liberal and conservative political beliefs?

Generally speaking, the political psychology of ideology literature predicts conservatives to be both motivationally avoidant and inhibited in cognitive style. Jost's Motivated Social Cognition Theory and Hibbing's Negativity Bias Theory address this issue only in passing, as our investigation in Chapter Two details. Recall that prior theories in political psychology have conflated approach-avoidance tendencies with emotional sensitivity differences. Approach and avoidance sensitivity is not the same as emotional sensitivity. The Motivated Social Cognition theory of Jost and colleagues posits that conservatives are psychologically motivated by needs to reduce uncertainty, ambiguity, threat, and disgust (Jost et al., 2003). The psychological needs of conservatives ought to be associated with increased sensitivity to avoidance and inhibition signals. As avoiding uncertainty, ambiguity, threat, and disgust are connected to Gray's theory of behavioral avoidance and behavioral avoidance has a connection to inhibition in Gray's theories, we might expect to see conservatives being higher in behavioral inhibition as well.

The relationship of ideology to motivational avoidance, inhibition, and negative affect has been explored in prior chapters. This chapter makes the claim that conflict monitoring is a part of the behavioral inhibition system. With that in mind, we can develop hypotheses on the relationship of conflict monitoring to political ideology, by

sketching a picture of the relationship of motivational avoidance and inhibition in ideology.

Uncertainty avoidance in conservatives is part of a general predisposition towards caution and general avoidance (Jost et al., 2003; Jost et al., 2009). Jost's theories also include the idea of conservatives being more inhibited. For example, Jost and colleagues repeatedly cite the Block and Block (2006) study that describes that "inhibited" preschoolers disproportionately grew up to be political conservatives (Jost et al., 2009; Jost, 2009). This evidence is used to demonstrate that the psychological differences between liberals and conservatives noted by their Motivated Social Cognition Theory occur early in life, before the emergence of political awareness. While motivational avoidance and inhibition are different psychological constructs, as Amodio et al. 2008 details, it could certainly be the case that conservatives have more sensitivity to both, and we have reason to believe that sensitivity to one would be positively correlated with the other.

The Negativity Bias Theory, of John Hibbing and colleagues, on the other hand, posits that conservatives have more sensitivity to negative emotions. This causes conservatives to exhibit stronger physiological reactions and focus greater attention to negative stimuli (Hibbing et al 2014). Again, emotional sensitivity is not the same construct as motivational avoidance, inhibition, or conflict monitoring, so Hibbing and colleagues have not explored how either would be related to their theory. In my view, being sensitive to negative emotions, though, has clear overlap with conflict monitoring.

Behavioral avoidance—the avoiding of unpleasant things—is typically an emotionally negative experience. Feelings of fear, disgust, and sadness are all negatively valenced and associated with motivated avoidance. Most negative emotions trigger motivational avoidance, although there is one exception. Anger is emotionally negative but behaviorally causes individuals to approach, as it directs the angry individual to engage with the subject of the anger.

In another Hibbing paper, Dodd et al. 2012 develop the idea that individual-level variation in physiological and attentional responses to aversive and appetitive stimuli are correlated with political ideology. Using skin conductance measures and eyetracking software, they find that conservatives have more sensitivity to aversive stimuli while liberals have more sensitivity to appetitive (pleasing) stimuli. They demonstrate that those on the right not only respond more strongly to aversive images but also devote more attention to aversive images.

The research from Dodd, Hibbing, and colleagues does not mention conflict monitoring specifically, but their study of attention opens the idea that conflict monitoring differences may exist. They find that both liberals and conservatives pay more attention to aversive images than appetitive images, but conservatives' attention to aversive images is relatively greater and more pronounced. Dodd et al. 2012 suggest that attention should be studied alongside other psychological and physiological differences of liberals and conservatives.

Thus, the Negativity Bias Theory would seem to be supportive of there being a relationship between conservatives and sensitivity to aversive stimuli. Hibbing, et al., 2014 note several studies that have found that conservatives focus more on threatening images and react more strongly to being startled (e.g. Dodd et al., 2012; Oxley et al., 2008). These reactions should properly be categorized as of an “inhibitory” nature rather than motivationally avoidant—the motivational drive to avoidance occurs chronologically *after* the startle reflex in response that Hibbing’s team observed.

Overall, while both theories would be deeply interested in how conservatives would differ from liberals on conflict monitoring they have thus far declined to wade deeply into the topic. Three different papers have looked at these issues in the brains of liberals and conservatives using the Go/No-Go task. We take them up below.

### **Amodio, Jost, and the Go/No-Go Behavioral Task**

Amodio et al. (2007) is the first study to look at conflict monitoring in liberals and conservatives on a Go/No-Go task (John Jost is one of the co-authors). They look at behavioral and electroencephalography data during a conventional Go/No-Go task. This study broke new ground in the literature by being one of the first to explore cognitive styles of liberals and conservatives with neuroscience techniques.

In the Go/No-Go task, participants must quickly respond to a frequently presented Go stimulus. Participants are habituated to expect the Go signal, which they receive about 80% of the time at random intervals. Each time the participant sees the Go signal, they must quickly (within 1000 milliseconds) press the Go button. However,

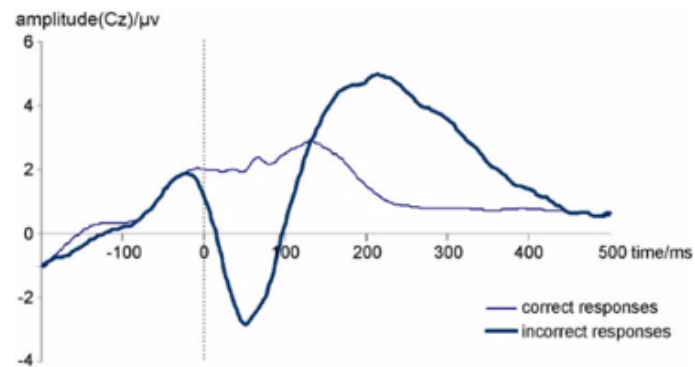


20% of the time, at unpredictable intervals, a No-Go signal appears. Upon seeing the unusual No-Go signal, participants must withhold the habitual pressing of the Go button. As the Go signal has become the prepotent response, participants struggle to accurately inhibit pressing the Go button. The difficulty of the struggle is demonstrated by decreased accuracy during No-Go trials. Where Go trials typically have an accuracy rate of greater than 98 percent, No-Go trials can have a significantly decreased accuracy rate of 70 percent or less. It takes careful attention and cognitive effort to resist the habitual Go response in response to the No-Go signal.

To assess performance on the task, researchers calculate an accuracy rate for Go trials and a separate accuracy rate for No-Go trials. The process of conflict monitoring is observed in how the participants handle the No-Go trials. Fewer errors on No-Go trials represents stronger, or more successful, conflict monitoring.

Electroencephalography (EEG) data can also be collected during a Go/No-Go task, which gives another measure of behavioral data corresponding to conflict monitoring. As noted above, researchers have found EEG related activity during the Go/No-Go task to be especially distinctive in the anterior cingulate cortex.

Figure 12. The Error-Related Negativity Component.

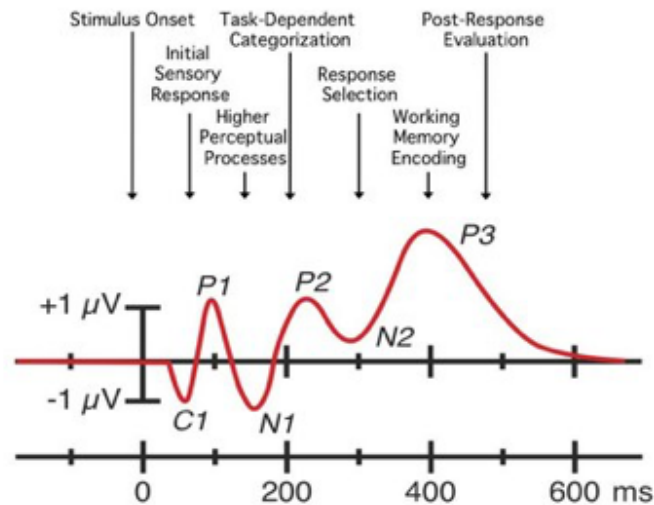


**Note:** The ERN is the sharp negative trough that occurs after 50ms during the incorrect responses (darker shade)

**Source:** Herrmann et al. 2004

An event-related potential (ERP) is a brain response measured with electroencephalography in response to a stimuli. Observing ACC activity during a No-Go error (that is, when the subject fails to inhibit pressing the Go button) reveals an particular ERP component called error-related negativity (ERN). As observed in Figure 12, Error-related negativity is a sharp spike in negative voltage that originates in the ACC region of the brain. This distinctive brain activity, typically occurring 50 milliseconds after the subject has locked in their response, represents the subject's realization that they pressed the button when they ought not have. A stronger error-related negativity response is associated with greater conflict monitoring.

Figure 13. Common ERP Components.



**Source:** Figure from ERPinfo.org, a non-profit website run by Steven Luck and Emily Kappenman, UC-Davis.

Another event-related potential component correlated with the Go/No-Go task is the N2. The N2 is the second negative peak observed in the ERP waveform (see Figure 13). A stronger (more negative) N2 peak is associated with increased conflict monitoring activity in the anterior cingulate cortex.

In congruence with the literature described above, Amodio and colleagues conceptualized the Go/No-Go task as a measure of conflict monitoring, which is part of a self-regulation process. They also agree with current literature that conflict monitoring is positively correlated with neurocognitive activity in the anterior cingulate cortex (ACC), in particular the two event-related potentials known as the error-related negativity component (ERN) and the second negative wave peak (N2).

So, which ideological group would have relatively higher conflict monitoring as measured in the Go/No-Go task? Following Jost's Motivated Social Cognition Theory, liberals are thought to be more cognitively flexible, reflecting higher tolerance for ambiguity and complexity, and greater openness to new experiences. Conservatives, in contrast, are cognitively rigid, tending to be more structured and persistent in their decision making. Amodio and colleagues (2007) posit that liberals' greater cognitive flexibility would translate into stronger and more active conflict monitoring. Thus, they predict in their 2007 article that liberals would make fewer accuracy errors on the Go/No-Go behavioral task, and would have stronger ACC related activity including larger average amplitudes for the ERN and N2 components. Their hypotheses are confirmed in the paper.

This theory is, however, a departure from the literature on Motivated Social Cognition Theory. Recall from the literature review that Amodio, in a different paper, (Amodio et al. 2008) establishes that the Go/No-Go task (and related ACC activity) is primarily a measure of behavioral inhibition. Our summary above of the political psychology of ideology—both the Motivated Social Cognition Theory of Jost and the Negativity Bias Theory of Hibbing—suggests that conservatives would likely be more inhibited. It seems clear that political conservatives ought to have more conflict monitoring or a stronger neural response to conflict monitoring processing.

The puzzle continues. In the literature review above, you can see that the Go/No-Go task, which taps into the anterior cingulate cortex, is consistently related to a

number of attentional cognitive processes, including conflict monitoring, response inhibition, and error detection. Noticeably absent from this list is “cognitive flexibility.” So where does “cognitive flexibility” come from? Amodio and his colleagues appear to conceptualize the Go/No-Go behavioral task differently between papers. In Amodio et al. 2008, when searching for a neural correlate of Gray’s Behavioral Inhibition System, they report that ACC related behavior from the Go/No-Go task is correlated with self-reported BIS scores, signifying that the Go/No-Go task is a measure of behavioral inhibition. We walk away from that paper thinking that the Go/No-Go task is about behavioral inhibition. And, if you independently consulted with Jostian theory of conservatism as motivation social cognition, you would assume that conservatives are likely more inhibited and, therefore, would have a stronger performance on the Go/No-Go task and more ACC related activity during the task.

However, Amodio et al. 2007 interprets the task differently from Amodio et al. 2008. Instead of behavioral inhibition, now this disposition is called cognitive flexibility. For this paper, Amodio and colleagues state that ACC activity from the Go/No-Go task reflects a general mechanism for monitoring response conflict, and they theoretically connect this general mechanism to a more flexible cognitive style for liberals. As they believe conservatives are more cognitively rigid, they will be less sensitive to conflict monitoring compared to liberals. Thus, liberals should have greater conflict-related ACC activity on the task compared to conservatives.

### **Replicating Amodio and Jost in the Go/No-Go Task**

To sort out this potential confusion, it would be useful to see how other researchers have looked at the Go/No-Go task and political ideology. Only one published paper has directly replicated Amodio et al. 2007. Weissflog et al. (2013) purportedly confirm the Amodio et al. 2007 findings that liberals made fewer errors and produced larger ACC-generated ERPs (ERN and NoGo N2). A key contribution for their study is that they go beyond self-identification of political ideology, employing related scales of egalitarianism and traditionalism. This is an important extension of the Amodio and Jost work because they (Amodio et al. 2007) are limited to a self-identification scale.

Weissflog and colleagues find that increased attitudes favoring social equality (egalitarianism) had the greatest contribution to ERN and N2 effects, and behavioral accuracy on the task was more strongly associated with openness to social change (traditionalism). In general, their findings follow the same story as the Amodio et al. 2007 paper, finding political liberalism across their scales was associated with improved accuracy and stronger ACC related neuroactivity on the Go/No-Go task. Like Amodio et al. 2007, Weissflog and colleagues interpret this finding as consistent with the Motivated Social Cognition theory (Jost et al. 2003), claiming this as support for the idea that liberals are more cognitively flexible than conservatives. Like Amodio and Jost, there is no account for how inhibition may or may not be associated with political liberalism.

There are some puzzling findings within the Weissflog et al. 2013 article worth considering. First, there are some issues with the sample employed. The initial pool was 256 Canadian undergraduates, but only 34 were chosen for the experiment. This very small sample had only two males, raising questions about gender as a confound. Moreover, on the self-placement scale, they lack solid representation from conservatives and oversample of extreme liberals. 13 were somewhat to extremely liberal, 13 neither, 8 were somewhat to moderately conservative. Zero participants were near the high limit of conservatism. Amodio et al. 2007 have this same problem—their article and appendices do not contain clear write-ups of the variable descriptives, but the scatterplot of the relationship between ideology and ERN amplitudes in Amodio et al. 2007 reveals very few moderate conservatives and zero extreme conservatives.

Additionally, the Weissflog paper finds no relationship between accuracy on NoGo trials and a measure of egalitarianism ( $p > 0.41$ ), which is inconsistent with their stated theory and the theory of the Amodio et al. 2007 paper. With egalitarianism being one of the major pillars of the Jost et al. 2003 theory of conservatism as motivated social cognition, we need more information to try to understand why the theory appears to break down on this key relationship.

Third, Weissflog and colleagues do fail to replicate one of the key relationships in Amodio et al. 2007. Recall that Amodio and colleagues find two ERP components to be related to political ideology, the ERN and the N2. These two components are supporting evidence to the idea that conflict monitoring is related to political ideology. Although

Weissflog and colleagues find consistent results with the N2 in their study, they fail to replicate the finding on the ERN ( $r = 0.27$ ,  $p = 0.13$ ). The ERN is very important to the claims in the Amodio article, and it is puzzling that the findings do not replicate. When Jost and Amodio (2012) examine the Weissflog study in a review paper, they do not comment on this counterintuitive finding.

Although Weissflog is the only direct replication of Amodio and Jost on the Go/No-Go task, there is another study that will be of interest to us with regard to political ideology. Inzlicht et al. 2009, in two small samples ( $n = 28$  &  $29$ ), study the ACC during a Stroop color-naming task (described above) as it relates to religious conviction. They theorize that religious conviction should be related to reduced activity in the anterior cingulate cortex (ACC) because the religious belief system helps to reduce incidents of uncertainty, conflict, and error by strengthening convictions and narrowing attention away from inconsistencies. Inzlicht and colleagues indeed find that weaker religiosity is connected to stronger ERN. As Jost and Amodio 2012 note, “given the strong association between conservatism and religiosity, this finding is broadly consistent with [our] results” (60).

Unfortunately, this study also has a few puzzling interpretation issues. First, religious belief is fundamentally different than political belief, even if the two are typically correlated. And, in fact, Inzlicht et al. find no relationship between political conservatism and religious belief in their sample. Jost and Amodio did not report



religiosity in their 2007 paper, so we do not know if they were able to measure or control for it.

Second, Inzlicht and colleagues wrap their theory around the idea of religious belief being a kind of anxiolytic drug that protects believers from cognitive conflict, reducing the need for conflict detection. The theory of Jost and Amodio around cognitive flexibility does not link into the anxiolytic drug hypothesis, and we could use more theoretical work to understand what the connection could be.

Third, another issue for connecting the Inzlicht et al. 2009 work to the Amodio and Jost findings is that Inzlicht et al. find no relationship between cognitive rigidity and religious belief (their table 1, pg. 388). Jost and Amodio 2012 (and, Amodio et al. 2007) theorize that cognitive rigidity is the reason why liberals outperform conservatives in the conflict monitoring tasks. Inzlicht demonstrates in study 1 that religion drives these effects on the behavioral task, and not cognitive rigidity does not. This leaves a puzzle for our interpretation, because Inzlicht and colleagues seem to test an important part of the Amodio and Jost hypothesis, and then rejects it.

Finally, as with Weissflog et al. 2013, Inzlicht et al. 2009 actually deliver another failed replication of a central Amodio et al. 2007 finding. As before, the ERN and conservatism results fail to replicate (their table 3 on pg. 390), with Inzlicht and colleagues finding no relationship between ERN activity and political conservatism. Additionally, Inzlicht and colleagues find no correlation between accuracy on the task and political conservatism whatsoever (their table 3, pg. 390). Remember that Inzlicht et

al. 2009 is not using a Go/No-Go task, but is instead using a Stroop task. These two tasks are conceptually similar in the way they are used by Inzlicht et al. and Amodio et al.

The discussion above illustrates the need for more replication of the Amodio et al. 2007 finding. The remainder of this chapter describes my study which is intended to directly replicate Amodio et al. 2007 using a larger sample of non-students while closely imitating the exact parameters of the Amodio Go/No-Go task. After I describe my findings, I will summarize how the three published studies intersect with the findings of this chapter.

### **Hypotheses**

This chapter focuses on a replication of Amodio et al. 2007. Although the literature review above raises more questions than answers about what kind of effects we ought to find for political ideology, I will lay out the same hypotheses as Amodio et al. 2007. The Conservatism as Motivated Social Cognition theory posits that conservatives have greater cognitive rigidity compared to liberals. This cognitive rigidity causes conservatives to be less adaptive to new and unexpected information. In a Go/No-Go task, Amodio and Jost expect that liberals will have a stronger (more negative) ERN response to making errors on No-Go trials, a stronger (more negative) N2 component on successful No-Go trials, and greater behavioral accuracy on the NoGo trials. The hypotheses are summarized in Table 9.

Table 9. Go/No-Go and ACC Hypotheses.

**Hypotheses (from Amodio et al. 2007)**

- H1** Conservatives have weaker (less negative) error-related negativity (ERN), reflecting more cognitive rigidity compared to liberals.
- H2** Conservatives have a weaker (less negative) N2 component, reflecting more cognitive rigidity compared to liberals.
- H3** Conservatives will have less accuracy on NoGo trials, reflecting more cognitive rigidity compared to liberals.

*Notes: ERN is the mean amplitude collected during -50ms and 150ms (response-locked) on NoGo error trials. N2 is the peak negative amplitude collected during 200ms and 400ms (response-locked) on NoGo correct trials.*

**Method***Participants*

Participants for this study are the same as in the prior chapters, but crucial details will be repeated here for completeness. Fifty-one non-student adults (age 24-52 years,  $M = 30.7$ ,  $sd = 5.8$ ) served as participants (32 female, 19 male). The testing session averaged less than two hours and 30 minutes, including breaks and the electroencephalography capping process. Participants completed four tasks during the session, and they had short breaks of five minutes between tasks. Participants were compensated at a rate of \$20/hour, with a minimum payment of \$40 and a maximum of \$50 for the session.

*Procedure*

After arriving at the laboratory, participants were briefed on the tasks they would perform, and asked to sign consent forms. Afterwards, they were led to a dimly-lit, sound-proofed room in a comfortable chair, approximately three feet from a nearby computer monitor. Experimenters were blind to participants' ideology scores and other attitudes.

After the capping process was completed, and testing was successful, participants completed four behavioral tasks in total, with numerous breaks. The total capping time was about 20-40 minutes, and the total testing time (including breaks) was about 110 minutes. The Go/No-Go behavioral task, the subject of this chapter's investigation, was the first of the four tasks. The Go/No-Go task took approximately 25 minutes to complete.

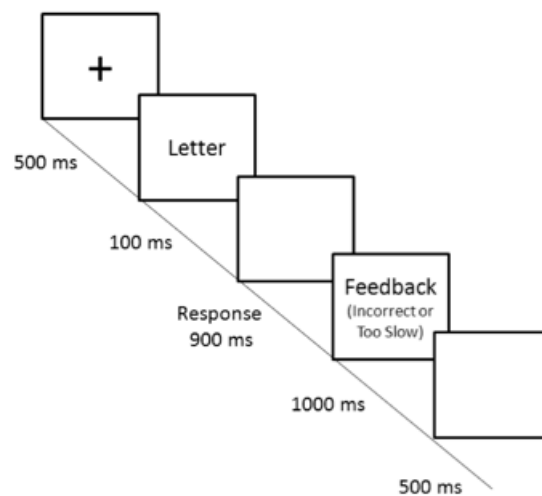
*Recording the EEG Signals*

As detailed in Chapter Five, I employed software techniques to convert our 64 channels of recorded data to virtual channels that correspond to the traditional 10-20 system, which allows comparison of my work to other Go/No-Go studies. These virtual channels in the 10-20 system allow researchers using diverse systems to be able to compare their results via a common mapping of scalp electrodes. The virtual electrode system in this chapter, and the general data filtering procedure follows the specifications of Chapter Five.

As with Chapter Five data, eyeblinks and other artifacts in the ERP signal were manually screened. ERP signals were filtered according to typical conventions. In this case, we used relatively strong filtering, removing frequencies below 1 Hz and above 30 Hz (96 dB, zero-phase shift). This strong filtering imitates the Amodio et al. 2007 study.

*Measuring Conflict Monitoring on the Go/No-Go*

Figure 14. An Individual Trial of Go/No-Go Task.



The procedure for collecting EEG data on the Go/No-Go task follows Amodio et al. 2007 closely. Subjects learned the Go/No-Go task with 100 practice trials, and then completed three blocks of 200 trials each, for a total of 600 trials. Figure 14 visually represents an individual trial in the Go/No-Go task. A fixation cross is first shown for 500ms, to focus and reset attention while steadying the eyes and face. Then, a letter briefly flashes on the screen. The letter “M” was a Go signal, and the letter “W” was a NoGo signal. Participants then had 900ms to response. During a Go trial, when the letter “M” was displayed, participants are supposed to press a large black button on a

remote controller in their hands with their pointer finger. During a NoGo trial, when the letter “W” was displayed, participants are supposed to do nothing and avoid pressing any buttons on their controller. After the response window ends, participants are shown a feedback screen for 1000ms, which informs them if they failed the trial. The feedback screen is triggered either by an incorrect response or if the participant responded after the 900ms interval (they were too slow). After the feedback screen, there is a final blank screen for 500ms before the next trial begins. After a block of 200 trials, participants received 30 seconds of rest before the next block began.

80 percent of signals were Go signals. When the high frequency of Go signals is coupled with a rhythmic, fast response, it creates a habitual, prepotent response in the subject to press the Go button in their hand. When the NoGo signal does trigger, for 20% of the trials, participants must inhibit their prepotent response and avoid pressing the Go button.

I measure three different kinds of data during the task. First, I measure an EEG component called error-related negativity (ERN), a strong negative wave that occurs after subjects make an error during a NoGo trial. An error during a NoGo trial means that the subject received the NoGo signal, but failed to correctly inhibit pressing the Go button. The ERN is the pattern that emerges when you aggregate all of the individual ERPs for each NoGo error trial together into a grand average, from -50ms to 150ms around the response. ERN occurs between 50 milliseconds before the error response through 150 milliseconds after the response. I measure the mean amplitude of the ERP

signal over that period of 200 milliseconds for analysis below. Amodio et al. 2007 used *mean* ERN amplitudes to estimate their ERP components, but Amodio et al. 2008 preferred *peak* ERN amplitudes. In this study, my results did not change by using peak amplitude measures, so I employed mean amplitude to be consistent with Amodio et al. 2007.

Second, I measured an additional EEG component called the N2, which is the second strong negative peak that occurs after subjects have a successful NoGo trial. A successful NoGo trial means the subject correctly inhibited pressing the habitual Go button after seeing the rarer NoGo signal. The N2 component is formed by aggregating ERPs from each successful NoGo trial together into a grand average waveform.

Following Amodio et al. 2007, we utilize the mean negative amplitude between 200 and 400 milliseconds, during a successful NoGo trial.

Finally, I measured behavioral accuracy on NoGo trials, which is the number of correct NoGo trials divided by the total number of NoGo trials. Higher accuracy on NoGo trials represents greater conflict monitoring in the subject.

### *Measuring Ideology*

Five survey measures of political ideology were utilized in this sample. These subjects and the ideology measures employed are identical to prior chapters. Like Amodio et al. 2007 and other replications, the sample skews left, and does not contain any “extreme” conservatives. This sample has a deeper pool of solid conservatives than previous research teams have been able to gather.

As a brief reminder, first, I utilize the conventional seven point self-placement scale from the American National Election Studies, which spans from “Very liberal” (1) to “Very conservative” (7). Second, I use the full Wilson-Patterson issue attitude battery (Wilson 1968; updated by Smith et al. 2011), which asks simple agree/disagree questions on 20 different topics in contemporary politics. The full scale is the aggregate number of conservative answers given in the 20 questions (ergo, a low score is more liberal and a high score is more conservative). Third, I use a subscale developed specifically for my data (see Chapter Four) that focuses on Wilson-Patterson items related to economic conservatism. Fourth, I use a parallel subscale designed to tap into social conservatism using Wilson-Patterson items. Finally, I employed a relatively uncommon, but useful, scale from the World Values Survey that focuses on principles of economic justice and fairness.

## Results

Before proceeding into the hypotheses, I will note a couple of results that speak to the general Go/No-Go task. In terms of accuracy in the task, NoGo trials were significantly more difficult than Go trials (accuracy of  $M_{nogo} = 0.77$ ,  $M_{go} = 0.995$ ;  $t(100) = 12.029$ ,  $p < 0.01$ ), as expected. Additionally, as expected, being more accurate on Go trials is correlated with being more accurate on NoGo trials ( $r = 0.37$ ,  $p < 0.01$ ). Individual differences in task performance are expected.

In terms of response time on the task, as expected, average response time on correct Go trials was slower than response time on NoGo error trials ( $M_{go} = 200.3$ ,



$M_{noGoError} = 165.8$ ;  $t(100) = 6.1343$ ,  $p < 0.01$ ). NoGo errors are a failure to inhibit the button pressing, so we would expect them to be made in haste. Also, as expected, response time on correct Go trials is correlated with response time on error NoGo trials ( $r = 0.695$ ,  $p < 0.01$ ). Again, individual differences in task performance are expected, so differences in response time should be correlated.

In terms of the ERP components being examined, a couple of important observations of this data. First, as expected, the mean ERN and peak ERN are very strongly correlated ( $r = 0.91$ ,  $p < 0.01$ ). Second, as expected, the mean N2 and peak N2 are also extremely highly correlated ( $r = 0.93$ ,  $p < 0.01$ ). These associations reveal why my results would not change substantially by using one variation of component measurement versus another.

Table 10. Correlation Matrix of Go/No-Go and ERP Component Results.

		<i>Ideology Measures</i>				
		<i>Self-reported</i>	<i>Issue Attitudes</i>	<i>Economic Issues</i>	<i>Social Issues</i>	<i>Economic Justice</i>
<i>Go/No-Go Task Measurements</i>	<b>ERP Components</b>					
	ERN	0.136	0.104	0.048	0.109	0.226
	N2	-0.221	-0.147	<b>-0.293*</b>	0.000	-0.093
	<b>Behavioral Data</b>					
	Go Trial Accuracy	<b>0.326*</b>	0.027	0.049	0.016	0.172
	NoGo Trial Accuracy	<b>0.275‡</b>	0.148	0.204	0.056	0.088

\*  $p < 0.05$ ; ‡  $p < 0.10$ . Correlation tests are two-tailed.

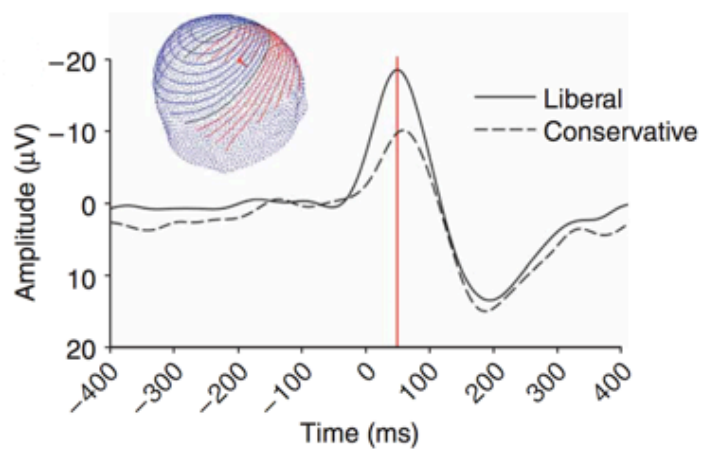
Note on ideology scales: higher values reflect more conservatism. Self-reported is the ANES 7 point scale. Issue attitudes is the full Wilson-Patterson scale. Economic and Social issues are Wilson-Patterson subscales. Economic Justice comes from the World Values Survey.

Table 10 presents correlations between the major variables of interest for the Amodio and Jost hypotheses.

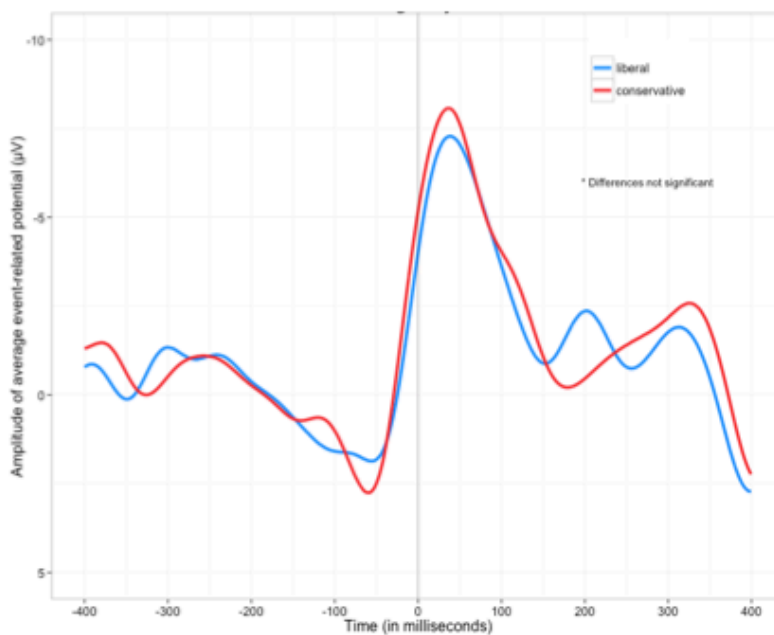
*Hypothesis 1: Conservatives have weaker ERN*

The first hypothesis is that political conservatism should be associated with a weaker (less negative) ERN component during errors made on NoGo trials. I fail to confirm this hypothesis. Contrary to the findings in Amodio et al. 2007, I find no statistically significant relationship between self-identified political ideology and ERN strength. Figures 14 and 15 visualizes data from Amodio et al. 2007 alongside with data from this chapter.

Figure 15. Grand Average ERNs and Political Ideology

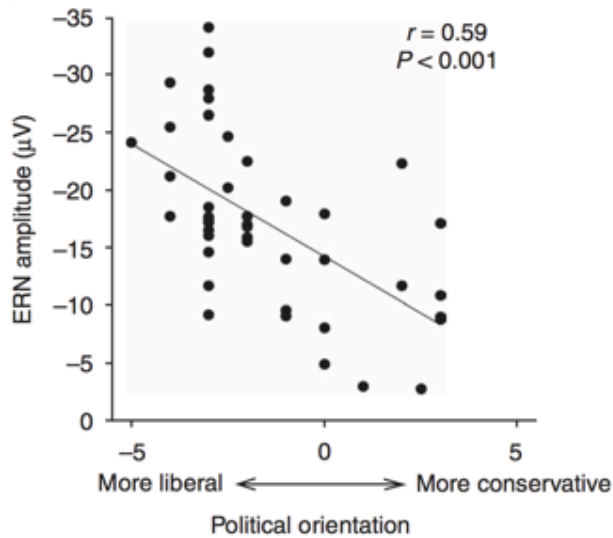


Amodio et al. 2007. Demonstrates stronger ERN for Liberals versus Conservatives.

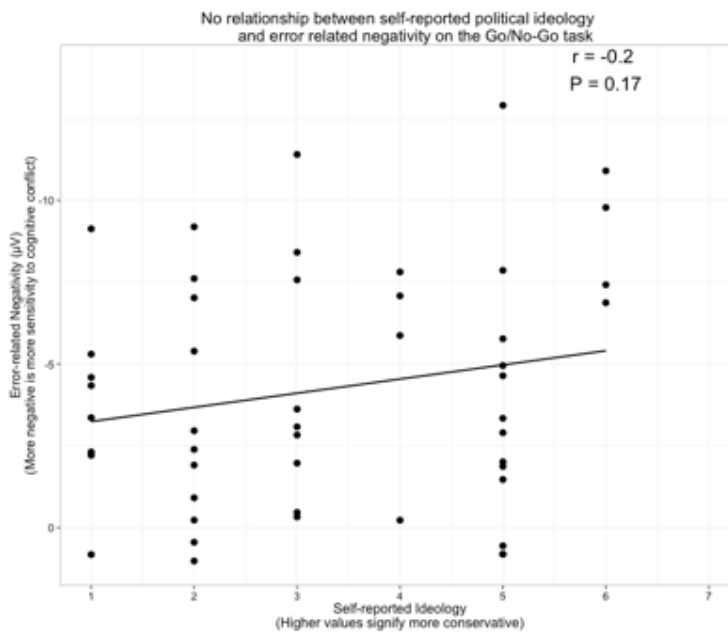


Data from this chapter. No ERN differences between Liberals and Conservatives.

Figure 16. Scatterplots of Ideology and ERN Data.



Amodio et al. 2007. Demonstrates strong relationship between ideology and ERN.



Data from this chapter. No relationship between ideology and ERN.

Recall that each replication study of Go/No-Go and political ideology utilized the self-identified ideology scale. Although my failed replication of the Amodio et al. 2007

findings is surprising, my null results are consistent with findings from Weissflog et al. 2013 and Inzlicht et al. 2009. Of four research teams with this data, three cannot find this relationship in their data.

I employed four other alternative measures of political ideology, including an index of 20 political issues that have been aggregated together (Wilson-Patterson), an economic conservatism subscale from the Wilson-Patterson scale, a social conservatism subscale from the Wilson-Patterson scale, and a battery of questions concerning economic justice from the World Values Survey. None of these measures have any relationship to ERN measures whatsoever, consistent with my null finding on the self-identification scale.

As Amodio et al. 2007 and Inzlicht et al. 2009 did not utilize alternative measures of ideology at all, the only replication paper that might contribute to this mystery is Weissflog et al. 2013. Weissflog et al. 2013 utilized Altemeyer's (1999) Right Wing Authoritarian Scale (1996) and Kluegel and Smith's egalitarianism and inegalitarianism scale (1986), which are at least distantly related to the general construct of political ideology. Weissflog et al. 2013 found that the liberal ends of each scale were correlated with stronger ERN responses. So, in this respect, my findings about alternative measures of ideology are at odds with the Weissflog findings, although it is worth considering how conceptually similar Right-Wing Authoritarianism and egalitarianism scales are to political ideology.

*Hypothesis 2: Conservatives have weaker N2 Component*

The second hypothesis is that political conservatism should be associated with a weaker (less negative) N2 component during successful NoGo trials. Unlike both Amodio et al. 2007 and Weissflog et al. 2013, I fail to find a statistical difference between self-identified liberals and conservatives on the N2 component. In fact, the correlation coefficient of self-reported ideology and the N2 component is trending towards statistical significance  $p = 0.055$ , but this effect is *reversed* from Amodio and Jost expectations—it is the self-identified conservatives who have a stronger, more negative, N2 component on the Go/No-Go task.

Table 10 shows that none of the alternative political ideology measures replicated the N2 results of Amodio and Jost, either. Unexpectedly, there is a statistically significant relationship between economic conservatism and a stronger (more negative) N2 component. This finding is unusual for a number of reasons. First, it is contrary to the Amodio and Jost predictions, as it is liberals who ought to have stronger N2 responses based on their 2007 paper, but my conservatives are so. Second, Jost's Motivated Social Cognition Theory treats *social* conservatism as a major part of being conservative, and it is odd to find the N2 completely unrelated to social conservative but instead important for economic issues, while at the same time unrelated to the economic justice scale. Overall, we should treat this finding with caution—it is inconsistent with the general picture of the null relationship, and it goes against all predictions.

*Hypothesis 3: Conservatives have less accuracy on NoGo trials*

The third hypothesis concerns whether conservatives have less accuracy on the difficult NoGo trials compared to liberals. While Amodio et al. 2007 finds liberals to have superior performance ( $r = 0.30$ ,  $p < 0.05$ ), I do not replicate this finding. Although the relationship does not quite reach the 0.05 threshold, self-identified conservatives in my sample are correlated with superior accuracy during NoGo trials ( $r = 0.275$ ,  $p = 0.055$ ). If anything, my self-identified conservatives are more accurate than liberals on the trials. Conservatives also outperform liberals on Go trials ( $r = 0.326$ ,  $p < 0.022$ ); Amodio et al. 2007 did not report data about Go trial accuracy and ideology.

The pattern of findings in the self-identified conservatives do not reappear in alternative ideological measures, giving pause in how to interpret the findings above.

**Discussion**

In summary, this chapter described the current state of knowledge about whether liberals and conservatives may have differences in their basic conflict monitoring processing, in the context of a Go/No-Go task. Following a ground-breaking study from Amodio et al. 2007, I set out to replicate their study as a way to sort out confusion over how the Go/No-Go task should be interpreted. If the conflict monitoring aspect of the Go/No-Go task is akin to behavioral inhibition, we would expect conservatives to have a stronger performance and neural activity on the task. However, Amodio et al. 2007 interpreted the Go/No-Go task as a measure of cognitive flexibility,

asserting (and finding) that liberals outperform conservatives on the task, as well as have stronger neural correlates during the task.

Table 11. Summary of Go/No-Go Studies.

<i>Research Studies</i>	<i>Conflict Monitoring Measurements</i>		
	<b>Stronger ERN</b>	<b>Stronger N2</b>	<b>Greater Accuracy on Difficult Trials</b>
Amodio et al. 2007	Liberals	Liberals	Liberals
Weissflog et al. 2013	<i>null</i>	Liberals	Liberals
Inzlicht et al. 2009	<i>null</i>	(n/a)	<i>null</i>
Wendell 2016	<i>null</i>	<i>null</i>	Conservatives

*Notes: Ideology relationships classified here are based on the self-identification scale, the only measure of ideology that is consistently employed by all four studies. Also note: Inzlicht et al. 2009 did not report N2 relationships between conservatism or religious belief.*

My study fails to replicate any part of the Amodio et al. 2007 study. Additionally, I wrote about two other studies that closely replicate Amodio et al. 2007, each which had their own trouble replicating the findings (Weissflog et al. 2013 had several elements successfully replicate). A summary of those findings are in Table 11. Overall, these studies are rather mixed in their findings. It appears that liberal and conservative differences require additional investigation and more careful study. My work demonstrates that liberal and conservative physiological differences may exist, but not concerning conflict monitoring in the anterior cingulate cortex.

As before, the results of this chapter urge caution moving forward for the psychological differences noted by Jost, Hibbing, and their colleagues. Further discussion of the big picture of the findings of this chapter are taken up in the next chapter.



## CHAPTER SEVEN

### DISCUSSION AND CONCLUSION

The political psychology of ideology holds great promise for our understanding about the origins of political beliefs. Political psychologists working in this tradition are beginning to understand the complex web of physiological, emotional, and cognitive factors that make up our political minds. This new wave of research has successfully pushed our understanding of political attitudes deep within the black box of human cognition, and it moves us closer to understanding our political identities.

Biology and politics scholars have established a research program based on differences in root psychological characteristics of liberals and conservatives. These differences have been shown to be both emotional and cognitive, and they have been linked to differences in behavioral outcomes. Additionally, and importantly, these scholars have shown that dispositional differences between liberals and conservatives emerge even outside of political contexts or political information. In other words, the root psychological differences between liberals and conservatives are not restricted to political topics alone, but can manifest in basic, everyday behavior and thought.

Two of the most important theories about the political psychology of political ideology featured prominently in this dissertation. The Negativity Bias Theory, my term for the research program coming from John Hibbing, Kevin Smith, and the Political

Physiology Lab of Nebraska University, posits that political conservatives have a persistent bias towards negativity, which attracts their attention and triggers stronger physiological reactions. The Motivated Social Cognition Theory, developed by social psychologist John Jost and numerous colleagues over the past few years, argues that psychological factors of fear, threat, and uncertainty avoidance motivate an individual to adopt conservative political beliefs.

The three studies presented in this dissertation follow closely in the literature that preceded them. First, I focused on dispositional traits related to emotion and cognition from outside of a political context. Second, following current work in psychology, I noted that negativity and avoidance are not the same theoretical construct, and this allowed my work to try to distinguish between the assorted dispositional differences noted by Hibbing and Jost. Third, my studies inherited hypotheses from these major theories. From the Negativity Bias Theory, I hypothesized that conservatives are more sensitive to negative emotion. From the Motivated Social Cognition Theory, I hypothesized that conservatives are more sensitive to avoidance and inhibition. Thus, the studies described in prior chapters establishes footing on these two theories, and in the theoretical space first outlined by research teams led by Hibbing and Jost.

My work contributes to this research program in two ways. First, I have integrated Gray's theories of behavioral inhibition and approach alongside these two prominent theories. My goal was to demonstrate how inhibition and activation are

conceptually related to the work of Hibbing and Jost, and then test a series of dispositional traits that ought to differentiate liberals from conservatives. I had hoped to clarify and enrich our understanding of the research on dispositional differences. Second, in the process of investigating inhibition and approach, I did a direct replication of one of the most important political neuroscience studies published in the subfield of biology and politics. This replication closely mimicked the methods of Amodio et al. 2007, while also using a larger sample of non-student adults. As of August 2016, Over 400 papers have cited Amodio et al. 2007 but there have been very few replications of this important study.

Overall, the studies in this dissertation have presented surprising results that urge caution for this research program. While searching for dispositional differences between liberals and conservatives with multiple methodologies, I was surprised to learn that very few dispositional differences could be found between liberals and conservatives. The bigger picture of my work could largely be called a robust null finding. This final chapter outlines my findings and integrates the bigger picture of the work with recommendations for how future studies should proceed. In particular, I will draw attention to the failed replication of Amodio et al. 2007, and urge caution for future studies of political cognition.

In the remainder of this chapter, I review the need for more replication in social science, and well as discuss the findings in this dissertation and the implications of my work for understanding how liberals and conservatives differ in cognitive flexibility.

## Replication Efforts in Social Science

My dissertation joins the recent movement towards more replication in social science. Social science has never been more popularly read or more influential than it is today. Driven by increased public outreach by scientists and universities, combined with a more empirically minded style of journalism, social science research has exploded into the public policy scene. This increased demand for social science is a good thing for society, informing debates and increasing the level of knowledge through rigorous, data-driven analysis. Never before has social science been so important to good governance and society. But, also, never before has it been more important to make sure that science is methodologically rigorous and open to analysis by outside research teams.

We already have examples of how errors in research have deeply affected the policy world. For example, in 2013, a graduate student studying economics uncovered an innocent spreadsheet error, and overturned an authoritative academic study that was being utilized by heads of state and Nobel prize winners to theorize over the role of government debt in the industrialized world (Roose 2013; Pollin and Ash 2013).

We also have examples of how the drive for fame and funding can tempt scholars towards cheating and fraud. Broockman and Kalla's uncovering of Michael LaCour's fraudulent publication in *Science* shocked the entire academic world (Singal 2015). The story was picked up by numerous major media organizations, including the New York Times and FiveThirtyEight (Carey and Belluck 2015; Bialik 2015). Another case, even more galling, is Dutch social psychologist Diederik Stapel notoriously faking data

for years, resulting in at least 55 publications made with fraudulent data (Bhattacharjee 2013; Neuroskeptic 2015; Uniers 2012).

These cases, rare and remarkable, made a huge splash in the media. But the larger struggles of social science to foster reproducible research have also become more public in recent years. Many commentators have discussed the issues of publication bias, researcher degrees of freedom, and p-hacking. Co-authors Leif Nelson, Joe Simmons, and Uri Simonsohn and their academic blog called Data Colada (<http://datacolada.org/>) as well as popular academic blogger Andrew Gelman (<http://andrewgelman.com/>) have coined the term “researcher degrees of freedom” as short-hand for a number of the issues that can arise with researcher null hypothesis testing. Publication bias, where academic publications tend towards publishing successful experiments that confirm hypotheses while confining negative results to a file drawer, has a sharp impact on the way modern science is practiced today. Recently, social scientists have become more and more anxious about these problems. Researcher Brian Nosek and the Many Labs project (over 270 scientists) created an initiative called the Reproducibility Project, published in *Science*, which aimed to sponsor and conduct replication studies of 100 recent psychology studies (Yong 2015). Unfortunately, only 40 percent of those replications successfully replicated the originals, and, on average, the size of the effect in the studies that did replicate were only half as large (Yong 2015).

These events illustrate the need for more replication of important social science work. My dissertation is intended to contribute to that need. Below, I summarize my results and discuss the implications for my replication of several key studies related to the political psychology of ideology.

### **Summarizing Dissertation Results**

In Chapter Four, I examined the survey data collected from 466 non-student adults employed by Loyola University Chicago. The primary purpose of the chapter was to summarize the demographic characteristics and politics of the sample from which I drew participants to undergo behavioral experiments in the lab. However, this survey also gave us an opportunity to test for differences self-reported dispositions towards inhibition and activation in a large N study, which could not be done on the small samples typically brought into laboratories. This work taps into the Motivated Social Cognition hypothesis about conservatives and behavioral inhibition. Based on prior research into the psychological profiles of conservatives, drawing from the empirical work of many research teams, we expected that conservatives would report greater behavioral inhibition compared to liberals. To my surprise, and against expectations from prior work, it was the liberals in the sample who reported higher behavioral inhibition. The correlation was moderate but statistically reliable.

Chapter Five combines self-reports in surveys on emotional affect with a measurement of electroencephalography in a laboratory setting. A survey questionnaire helped me assess trait sensitivities towards many discrete emotions, and

general negative affect. I also had the opportunity to measure frontal electroencephalography in these subjects, which can depict a pattern of brain activity that is known to be connected to both negative emotion and avoidance sensitivity. My findings, again, are surprising. Across all of the trait emotional sensitivity scales employed, I found robust null results. No evidence was found for the idea that conservatives are more sensitive to negativity in this sample. Additionally, the electroencephalography measure of frontal hemispheric asymmetry revealed that liberals and conservatives do not have different patterns of brain activity. As the patterns are a neural correlate of sensitivity to both avoidance sensitivity as well as negative emotion sensitivity, these findings are puzzling and challenging for both the Negativity Bias Theory and the Motivated Social Cognition Theory predictions, as conservatives in this study are neither sensitive to negative affect nor are they dispositionally avoidant. Overall, I find that liberals and conservatives do not have differences in emotional sensitivity or in frontal hemispheric asymmetry.

Chapter Six continues the investigation using electroencephalography measures alongside a behavioral experiment called the Go/No-Go task. My goal was to investigate conflict monitoring processes in the brain, which have been connected to avoidance and inhibition in past literature. The Go/No-Go task allowed me to look for differences in accuracy and anterior cingulate cortex related neural activity between liberals and conservatives. This study was also an attempt at a direct replication of an important and ground-breaking study in political neuroscience study by Amodio et al. (2007), by

using a non-student sample and more richly measuring political ideology. I did not replicate these findings, however. Liberals in my study did not have better accuracy on the Go/No-Go task, and did not have statistically different neural activity in the anterior cingulate cortex.

Next, I will address the implications of my work for our understanding of liberals and conservatives. My results have large implications for how researchers should consider and study the work of Amodio et al. 2007. Below, I specifically focus on what we can learn about the cognitive flexibility of liberals and conservatives from studies of the Go/No-Go task.

### **Political Ideology and Cognitive Flexibility**

Amodio et al. 2007 introduced the research world to liberal and conservative differences in behavioral conflict monitoring, as measured with the Go/No-Go task. They find that liberals are more successful at inhibiting habitual responses with the introduction of unexpected information. This increased success is also correlated with increased neural activity related to the Anterior Cingulate Cortex (ACC), a region of the brain known to be associated with conflict monitoring. Amodio and colleagues review their evidence, and find that the pattern of their data suggests that liberals are more cognitively flexible.

Three statistical relationships form the foundation of the paper. The first measure, purely behavioral, is that liberalism is associated with increased accuracy on NoGo trials. Liberals are more successful at inhibiting their habituated Go response



when they see a NoGo signal. Conservatives, in contrast, are more persistent in their response patterns, causing increased errors when a change in response behavior is called for.

The next two measures are based on event-related potentials (ERPs), which are consistent patterns of brain activity observable as electric signal on the scalp in response to particular stimuli. The second measure is an ERP called error-related negativity (ERN) during failed NoGo trials. ERN is a component that arises in the individual when they fail to correctly inhibit the Go button press during a NoGo trial. Upon realizing the error, there is a distinctive pattern of brain activity that represents a sharp negative trough about 50 milliseconds after the mistaken button press. Liberals have a stronger (more negative) ERN component in response to a failed trial, reflecting greater conflict monitoring neural activity. The third measure is an ERP called the NoGo N2, which is a component that arises in the brain in response to a successful inhibition during a NoGo trial. When subjects successfully inhibit the Go button press in response to a NoGo signal, there is a strong negative trough in the electroencephalography signal, occurring roughly around 200 milliseconds. This negative trough is the second observable trough in the signal, giving rise to the name "N2." Liberals were observed to have a stronger (more negative) NoGo N2 compared to conservatives. Again, this neural difference is believed to represent a difference in basic conflict monitoring sensitivity, with liberals being more sensitive than conservatives. As conservatives have

less conflict monitoring related neural activity, they are deemed to be less cognitively flexible and more persistent than liberals.

As of August 2016, the Amodio et al. 2007 paper has been cited over 400 times. Biology and politics literature in both Political Science and Psychology have relied on this paper for establishing that physiological and psychological differences between liberals and conservatives can be observed directly in brain functioning, even during a task that is completely unrelated to politics. These findings have been cited by Hibbing and colleagues as an example of how liberals and conservatives are different in their core or root psychological dispositions, deeply within the biological self (e.g. Hibbing et al. 2014). These findings have also been useful and illustrative for Jost and colleagues, as liberals being more cognitively flexible fits nicely with the Conservatism as Motivated Social Cognition theory (e.g. Jost and Amodio 2012; Jost et al. 2003). In fact, revealingly, the literature that Jost created and inspired is often referred to as the Rigidity-of-the-Right hypothesis.

Although Amodio et al. 2007 continues to be widely read and widely cited, there has been only one published attempt to replicate (Weissflog et al. 2013). There is also one other published study on religious belief and conflict monitoring using a Stroop task (Inzlicht et al. 2009). This study was referenced by Jost and Amodio 2012 as being broadly consistent with Amodio et al. 2007, and they consider it broadly as an extension of their work (Jost and Amodio 2012, 60). To the best of my knowledge, this dissertation presents the second attempt to directly replicate Amodio et al. 2007.

In Chapter Six, I reviewed all known data on the relationship between conflict monitoring and political ideology and offered a new study of my own. To review briefly, I find that Amodio et al. 2007 has not been successfully replicated in full by any published study. Weissflog et al. 2013 comes closest, and it does contain findings that are supportive of the Amodio et al. 2007 theory. Some attitudinal measures in this study (traditionalism and egalitarianism) are conceptually related to political liberalism, and are shown by Weissflog and colleagues to be correlated with increased behavioral accuracy and increased neural activity reflected in the ERN and N2. This fits with Amodio et al. 2007's three central findings, but used different scales for political ideology. However, in terms of ideological self-identification, the measure employed by Amodio et al. 2007, Weissflog and colleagues did not replicate one of the three core Amodio et al. Findings, specifically that self-reported liberals have stronger (more negative) ERN during the task. Data from the Weissflog et al. study trends in a consistent direction, but failed to reach conventional levels of statistical significance ( $p = 0.13$ ). Weissflog et al.'s sample was 32 undergraduate students at a Canadian university. This sample size is not unusually small for a neuroscience study, but the small size could potentially explain why they failed to replicate (but, then, we would also need to be skeptical about the relationships that they did show.)

What about the Inzlicht et al. 2009 study? Inzlicht and colleagues studied the relationship of religious belief to conflict monitoring using a Stroop task in a conceptually similar way to a Go/No-Go task. Inzlicht and colleagues presented data on

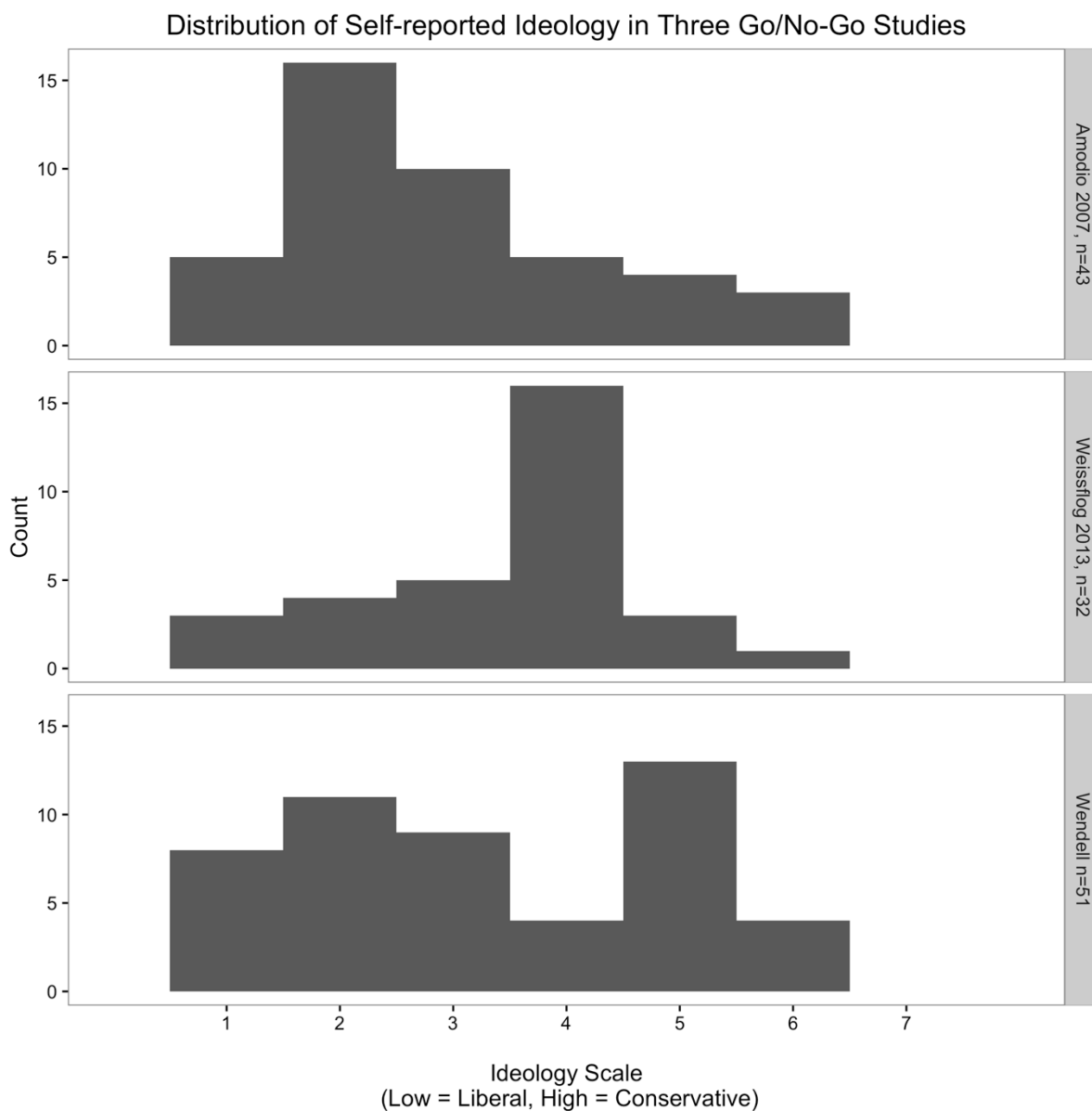
22 undergraduates that showed decreased religious belief to be related to increased accuracy on the Stroop task and increased strength of the ERN. Non-believers performed better on the behavioral task and had a stronger ERN component. Jost and Amodio 2012 cite this paper as supportive for the theory of Amodio et al. 2007 because religious belief is closely related to political conservatism. In the view of Jost and Amodio 2012, Inzlicht's work demonstrates that religious believers—who are likely political conservative—do worse on the task and have a weaker ERN response because they are less cognitively flexible than religious non-believers (who are likely to be liberal) (Jost and Amodio 2012, 60).

However, this reading of the Inzlicht findings has several problems. First, Inzlicht et al. specifically find no relationship between religious belief and political conservatism in their sample (Table 3, 390) They also specifically find no relationship between political ideology and ERN amplitude (Table 3, 390). Inzlicht and colleagues state that “the correlation between the ERN and religious conviction did not diminish after we controlled for conservatism, IQ, or any of the Big Five personality factors” (389), arguing that political conservatism cannot explain the correlation between ERN and religious conviction that they found (389). Moreover, religious believers actually had *improved* behavioral accuracy on the task, which is contrary to what Amodio et al. 2007 and Jost and Amodio 2012 would have predicted. Finally, religious believers in Inzlicht et al. had no relationship to “cognitive closure” (Table 2, 388), which presents problems for considering the religious believers to be cognitively rigid.

My study of liberals, conservatives, and the Go/No-Go task attempted to closely replicate the methods and design choices of Amodio et al. 2007. As described above, and with great detail in Chapter Six, I ultimately find no support for any differences between liberals and conservatives on the task. The three important metrics connected to liberals described in Amodio et al. 2007—increased behavioral accuracy, increased ERN strength, and increased N2 strength—are not present in my data. Before considering implications of these failures to replicate, we should consider the strength and usefulness of the samples across the relevant Go/No-Go studies.

### **Comparing Samples of Go/No-Go Data**

Figure 17: Measures of Ideology in Three Go/No-Go Samples



Note: Amodio et al. 2007 and Weissflog et al. 2013 utilized a self-report ideology scale with 11 points instead of the conventional 7 point scale used widely in political science and public opinion surveys such as the American National Election Studies. I transformed their data from 11 point to 7 point by multiplying each subject's score by  $(7/11)$ . The histogram bins further smooths out all three distributions to provide a generalized picture of the data from the studies that allows clear comparison.

The figure above presents the ideological distribution of the samples employed by Amodio et al. 2007, Weissflog et al. 2013, and Chapter Six of my dissertation. Information about the ideological spread of Inzlicht et al. 2009's sample is unavailable, unfortunately. Data for the outside studies in this figure were compiled by me through close viewing of the supplied scatterplots. The raw data from both studies are not available online.

A key goal of replication of the Amodio et al. 2007 Go/No-Go experiment was to increase the number of political conservatives in the sample. As can be observed in the figure above, my sample includes substantially more subjects who self-place on the conservative side of the scale. Like the prior studies, I had difficulty finding extreme conservatives (e.g. the sevens) who were willing to come into the lab. However, I was able to recruit a total of 17 subjects who identified right-of-center. Amodio et al. 2007 and Weissflog et al. 2013 each had 8 subjects who identified right-of-center.

Another key goal was to broaden the sample in age range and size. Both Amodio et al. 2007 and Weissflog et al. 2013 utilized a convenience sample of college undergraduates. Amodio et al. 2007 featured 43 students recruited from both UCLA and New York University, while Weissflog et al. 2013 used 32 students from Brock University in Canada. I used a convenience sample of 51 non-student employees at Loyola University Chicago. Consequently, both Amodio and Weissflog have age distributions in the normal undergraduate college range, while my sample averaged 30.7 years old, with standard deviation of 5.8 years and a range of ages from 24-52

years. My sample and Amodio et al. 2007 each had 63% females, while Weissflog et al. 2013 was about 94% female (2 males of 32 participants). My sample was also approximately 18% larger than Amodio et al. 2007 and 60% larger than Weissflog et al. 2013. Overall, thus, my sample has considerable strengths over the other two studies in terms of representativeness both politically and demographically.

### **Next Steps**

Overall, the results from these studies offer a few important conclusions. First, in a big picture sense, it does not appear that Gray's systems of behavioral inhibition and behavioral activation manifest differently between liberals and conservatives. Whether measuring disposition towards inhibition and avoidance with a survey questionnaire, or with emotional valence in hemispheric asymmetry measures, or with the Go/No-Go task and anterior cingulate cortex measures, the results paint a fairly robust null finding. This was a worthwhile area of investigation, given the emphasis in prior literature on base level physiological differences between liberals and conservatives concerning related phenomena like emotional sensitivity towards threat, fear, and disgust. Yet, across these studies, we largely get a robust null finding for conservatives being more inhibited. More work with different samples could significantly contribute to these questions, but for the moment, generalizing from these three studies, it appears clear that liberals and conservatives do not have meaningful differences in behavioral motivations to inhibit (and, approach sensitivity, too, did not



seem to be related to political ideology, which was a more exploratory objective in this dissertation).

A second important conclusion is that the work on emotional sensitivity in Chapter Five fails to find evidence that conservatives are more sensitive to negative emotion or more sensitive to avoidance. Persuasive work from Hibbing and colleagues suggest conservatives pay more attention to negative stimuli and are more sensitive to the effects of negative emotion. Jost and colleagues have research that suggests conservatives could be more avoidant in cognitive style. In Chapter Five I explore these ideas by measuring sensitivity to positive and negative affect, as well as measuring frontal hemispheric asymmetry, which is a well-known neural correlate for sensitivity to emotion and avoidance. With multiple measures of political ideology, I do not find a robust correlation between negative emotion and political conservatives on the emotional scales. I also do not find that conservatives have the hemispheric asymmetry pattern that has been correlated to negative emotion and avoidance sensitivity.

Finally, a third important conclusion is that the widely cited Amodio et al. 2007 has not been successfully replicated in whole. My experiment fails to replicate, and I bring attention to two published studies that also struggle to replicate some of the major findings of the Amodio et al. 2007 article. Given the relatively scarcity of studies that note important root cognitive differences between liberals and conservatives outside of Amodio et al. 2007, we continue to have a dire need for more studies in this area. Go/No-Go task performance and related anterior cingulate cortex activity will

need additional studies to more firmly establish a connection between liberalism and cognitive flexibility because critical questions remain about whether a difference currently exists.

Briefly, we can summarize some of the standard limitations with studies like mine. First, as already noted in Chapter Four, the sample is not nationally representative. This pool of participants is drawn from one geographical location at one specific time and place. Moreover, they were unusual in the sense that they worked at a university and had a much higher level of education than the general public. As non-student adults, they do have the advantage of having a diversity of ages and experiences that are not typically present in most convenience samples. Second, the recruitment survey sample size was reasonably large for social science research (at 466 participants) but still not large enough to effectively capture a deep poll of extreme conservatives. Peer work in this area also has great difficulty getting strong conservatives into their study, and this study is an improvement over past studies in this regard.

Another limitation is that the measures in the survey are all self-reported, and we can only draw correlational inferences. The relationship I find between self-reported behavioral inhibition and liberalism could have several explanations that the survey data alone cannot account for. Principally, the challenge for interpretation is over how to interpret the self-reports. Are conservatives less inhibited, or do they report less inhibition on surveys, due to social desirability differences or self-perception

differences? Additionally, as always with correlational studies, causation cannot be determined.

Later chapters address the weaknesses of survey data by bring subjects into the lab, but these studies have standard limitations as well. The sample size of the neuroscience studies was only 51 people. While 51 subjects is significantly above average for electroencephalography studies, more statistical power would always be useful for trying to spot effect sizes that are not expected to be very large.

The project of biology and politics continues to be incredibly promising for understanding the puzzle of political ideology. As Hatemi and McDermott (2011) write, biological models of political behavior have vast potential to contribute meaningfully to studies of political behavior. When I began this work in 2012, I was looking to expand our understanding of how conservatives and liberals differ dispositionally by looking at multidimensional ideology. At the conclusion of my work, however, I want to bring attention to something else entirely. The results of my studies strongly suggest a compelling case for why we need more work to better understand the dispositional differences of liberals and conservatives. My dissertation posits that the question of root psychological differences between liberals and conservatives is still largely open for consideration.

**APPENDIX A**  
**SURVEY QUESTIONNAIRE**



**LOYOLA  
UNIVERSITY  
CHICAGO**

*Preparing people to lead extraordinary lives*

**LOYOLA UNIVERSITY  
CHICAGO**

Lake Shore Campus  
1032 W. Sheridan Rd  
Chicago, Illinois 60660

### Survey about American Politics

Thank you for agreeing to take this survey. Our research team is studying politics and personality. Your answers will help Loyola University Chicago researchers with important questions related to the political beliefs of citizens in the United States.

Below, we ask you about some of your political beliefs as well as some questions about you. We think you may enjoy answering these questions, and your cooperation will help us. **Your answers will be confidential and your personal results will never be reported in a way that could identify you. We will take several measures to insure confidentiality; responses will be held under lock and key in the professors' offices, the page with your personal information will be separated from the response page and a random code will be used to identify your responses, after the research project is finished any identifying information will be destroyed.** This survey should take approximately 5-10 minutes to complete. Please find the self-addressed envelope enclosed to send back your completed survey.

There are no foreseeable risks or discomforts involved in participating in this research beyond those experienced in everyday life. There are no direct benefits from this research to you from participation, but your participation will be useful in helping us develop a better understanding of how people think about politics and make political decisions, which is important to maintaining a healthy democracy. We understand that your participation is voluntary and we do appreciate you taking the time to help us. If you do not want to be in this study, you do not have to participate. Even if you decide to participate, you are free not to answer any question or to withdraw from participation at any time without penalty. If you have any questions concerning this research please contact Professor Richard E. Matland at Loyola University Chicago at (773) 508-7127. If you have further questions about your rights as a research participant, you may contact the Loyola University Office of Research Services at 773 508 2689. By completing the survey you are agreeing to participate in this portion of our research.

**Thank you again for your help with this research. We hope you enjoy the survey!**

Before we begin, what is your unique ID#? \_\_\_\_\_  
 (You can find this in the letter or email that we sent to you)

1. Sometimes, people consider themselves to be liberals or conservatives when it comes to politics. On a scale of 1-7, with one being very liberal, 4 being centrist, and 7 being very conservative, where would you place yourself? (circle the number)

1	2	3	4	5	6	7
↑			↑			↑
Very Liberal			Centrist			Very Conservative

\_\_\_ I don't know (mark with X)

2. Below, you will see two opposed statements along a line of boxes. On a scale of 1 to 10, which statement tends to represent your viewpoint better? (circle the number)

1	2	3	4	5	6	7	8	9	10
↑									↑
Income should be made more equal.					We need larger differences in income as incentives for individual effort.				

1	2	3	4	5	6	7	8	9	10
↑									↑
Private ownership of business and industry should be increased.					Government ownership of business and industry should be increased.				

1	2	3	4	5	6	7	8	9	10
↑									↑
The government should take more responsibility to ensure that everyone is provided for.					People should take more responsibility to provide for themselves.				

1	2	3	4	5	6	7	8	9	10
↑									↑
Competition is good. It stimulates people to work hard and develop new ideas.					Competition is harmful. It brings out the worst in people.				

**3. Now, please indicate with a circle whether you support or oppose each topic below.**

Choose the answer that is closest to your beliefs. It will sometimes be difficult for you to choose because you can see both sides of the issue. When this occurs, try to pick the option that you think you lean towards more.

Prayer in schools	Support	Oppose	War in Afghanistan	Support	Oppose
Pornography being sold to adults	Support	Oppose	Welfare spending	Support	Oppose
Strong penalties for illegal immigration	Support	Oppose	More tax cuts	Support	Oppose
Women's equality	Support	Oppose	Increases in gun control	Support	Oppose
Death penalty	Support	Oppose	Increases in military spending	Support	Oppose
Patriot Act	Support	Oppose	Police searches without warrants	Support	Oppose
Biblical truth	Support	Oppose	Increases in pollution control	Support	Oppose
Gay marriage	Support	Oppose	Small government	Support	Oppose
Legal abortions	Support	Oppose	Foreign aid	Support	Oppose
Patriotism	Support	Oppose	Free trade	Support	Oppose

For the questions below please put an X next to the statement in each pair that you lean towards the most.

**4a. In your opinion, society works best when . . .**

<input type="checkbox"/> People live according to traditional values
<input type="checkbox"/> People adjust their values to fit changing circumstances

**4b. In your opinion, society works best when . . .**

<input type="checkbox"/> Expectations of how people should act are allowed to evolve over time
<input type="checkbox"/> Expectations of how people should act are based on an unchanging code

**4c. In your opinion, society works best when . . .**

<input type="checkbox"/> Our leaders stick to their beliefs regardless
<input type="checkbox"/> Our leaders change positions when situations change

**4d. In your opinion, society works best when . . .**

<input type="checkbox"/> People assume those in faraway places are mostly like us
<input type="checkbox"/> People realize those in faraway places are mostly different from us

**4e. In your opinion, society works best when . . .**

- We realize we need to take care of our own people first  
 We realize people everywhere deserve our help

**4f. In your opinion, society works best when . . .**

- Those who break minor rules are forgiven  
 Those who break minor rules are punished

**4g. In your opinion, society works best when . . .**

- More fortunate members contribute more  
 Every member contributes equally

**4h. In your opinion, society works best when . . .**

- People are rewarded according to merit  
 People are rewarded according to need

**4i. In your opinion, society works best when . . .**

- People join together to help others  
 People take responsibility for their own welfare

**4j. In your opinion, society works best when . . .**

- People are proud they belong to the best society there is  
 People realize there are many ideal societies and no single best society

**4k. In your opinion, society works best when . . .**

- Our leaders are mostly questioned  
 Our leaders are mostly obeyed

**4l. In your opinion, society works best when . . .**

- Our leaders make the decisions  
 Our leaders are forced to listen to others

**4m. In your opinion, society works best when . . .**

- People recognize that flaws of human nature can be positively changed  
 People recognize that flaws of human nature are unchangeable

**4n. In your opinion, society works best when . . .**

- Our leaders compromise with their opponents in order to get things done  
 Our leaders adhere to their principles no matter what



**5. Now, we are going to ask you several questions about you and your personality. Please indicate whether you strongly agree (SA), agree (A), disagree (D) or strongly disagree (SD) with each statement.(circle)**

If I think something unpleasant is going to happen I usually get pretty worked up.	SA	A	D	SD	If it would excite me to win a contest.	SA	A	D	SD
I worry about making mistakes.	SA	A	D	SD	When I see an opportunity for something I like, I get excited right away.	SA	A	D	SD
Criticism or scolding hurts me quite a bit.	SA	A	D	SD	When I want something, I usually go all-out to get it.	SA	A	D	SD
I feel pretty worried or upset when I think or know somebody is angry at me.	SA	A	D	SD	I go out of my way to get things I want.	SA	A	D	SD
Even if something bad is about to happen to me, I rarely experience fear or nervousness.	SA	A	D	SD	If I see a chance to get something I want, I move on it right away.	SA	A	D	SD
I feel worried when I think I have done poorly at something.	SA	A	D	SD	When I go after something I use a "no holds barred" approach.	SA	A	D	SD
I have very few fears compared to my friends.	SA	A	D	SD	I will often do things for no other reason than that they might be fun.	SA	A	D	SD
When I get something I want, I feel excited and energized.	SA	A	D	SD	I crave excitement and new sensations.	SA	A	D	SD
When I'm doing well at something, I love to keep at it.	SA	A	D	SD	I'm always willing to try something new if I think it will be fun.	SA	A	D	SD
When good things happen to me, it affects me strongly.	SA	A	D	SD	I often act on the spur of the moment.	SA	A	D	SD

**6. Generally speaking, do you usually think of yourself as a Democrat, a Republican, or an Independent? (put an X in the best fit)**

- |                     |   |  |
|---------------------|---|--|
| I am a Democrat     | ➡ | <input type="checkbox"/> I am a strong Democrat                        |
|                     |   | <input type="checkbox"/> I am not a strong Democrat                    |
| I am an independent | ➡ | <input type="checkbox"/> I am independent but lean towards Democrats   |
|                     |   | <input type="checkbox"/> I am independent from either party            |
|                     |   | <input type="checkbox"/> I am independent but lean towards Republicans |
| I am a Republican   | ➡ | <input type="checkbox"/> I am a not a strong Republican                |
|                     |   | <input type="checkbox"/> I am a strong Republican                      |
| I am not sure       | ➡ | <input type="checkbox"/> I am not sure                                 |

**We are almost done with the questions. Here are a few questions to provide us with general demographic information to help us compare answers.**

7. What is your gender? (put an X in the best fit)
- Female  Male
8. I consider myself: (put an X in the best fit)
- Strongly right-handed
- Somewhat right-handed
- Ambidextrous (Neither right-handed nor left-handed)
- Somewhat left-handed
- Strongly left-handed
9. In what year were you born? \_\_\_\_\_
10. What is your current marital status? (put an X in the best fit)
- Married
- Widowed
- Divorced
- Separated
- Never married
- Living with partner
11. What is the highest level of education you have completed? (put an X in the best fit)
- No formal education
- Elementary school (1<sup>st</sup> grade through 5<sup>th</sup> grade)
- Middle school (6<sup>th</sup> grade through 8<sup>th</sup> grade)
- Some high school, no diploma (9<sup>th</sup> grade through 11<sup>th</sup> grade)
- High school diploma
- Some college, no degree
- Associate degree
- Bachelor's degree
- Master's degree
- Professional or Doctorate degree

12. Are you of Hispanic or Latino ethnicity, such as Mexican, Chicano, Puerto Rican, Cuban, or other background from Central America, South America, or the Caribbean?*(put an X in the best fit)*

- No  
 Yes

13. Which of the following best describes your race? *(put an X in the best fit)*

- Black or African American  
 Asian American  
 Pacific Islander or Hawaiian  
 Native American or Alaskan Native  
 White or European American  
 Two or more races  
  
 Other: \_\_\_\_\_

**Thanks for helping us with this survey! Your help is greatly appreciated. We just have one more question for you on the following page.**

**14.** Do you wish to be considered for our research project involving brain imaging and society? We will offer you **\$40 to \$50** for 2 or 2.5 hours of your time answering questions in our lab at Loyola University Chicago on the Lakeshore Campus. We will schedule the appointment at your convenience in the next month. **The experiment is non-invasive and will not harm you in any way.** If this sounds interesting please say yes and we will contact you with more details. Your participation will continue to be confidential. Your results will provide us very important data and your help would be greatly appreciated.

No, I am not interesting in participating.

Yes, I am interested in participating, please send me more information.

Name: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Phone number(s): \_\_\_\_\_

When is the best time to call? \_\_\_\_\_

**Thanks for your participation in this survey! Please mail back your completed survey using the included envelope.**

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## VITA

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