A Generalized Arousal Model of Political Orientation

by

Shona Melissa Tritt

A thesis submitted in conformity with the requirements for the degree of Doctorate of Philosophy

Department of Psychology
University of Toronto

© Copyright by Shona Melissa Tritt 2014
A Generalized Arousal Model of Political Orientation

Shona Melissa Tritt

Doctorate of Philosophy

Department of Psychology

University of Toronto

2014

Abstract

The majority of psychological theories of political orientation are predicated on the assumption that negatively-valenced emotion enhances conservative belief. In support of this notion, exposure to fear-inducing and disgusting stimuli motivate conservative versus liberal shifts in political beliefs. However, we have recently suggested that research in this area has confounded valence with arousal, which may have led to the premature conclusion that negative valence, rather than arousal more generally, is associated with conservative political beliefs. In a series of 4 studies, we tested the hypothesis that arousal, rather than negative valence \textit{per se}, promotes conservative orientation. In Studies 1 and 2, experimentally-induced positive as well as negative emotional arousal was associated with enhanced agreement with right-wing political speeches, controlling for baseline political orientation. Studies 3 and 4 used event-related potentials (ERPs) to determine the relationship between political orientation and electrophysiological sensitivity to emotional stimuli. In Study 3, conservatism versus liberalism was associated with heightened feedback-related negativity -- an ERP component thought to index activity in neural regions associated with reward processing -- in response to positive feedback. In Study 4, conservatives, compared to liberals, demonstrated heightened amplitude of the late positive potential (an ERP component that covaries with the motivational salience of stimuli) in response to emotional stimuli, regardless of valence. Taken together, these investigations provide preliminary evidence to support an \textit{arousal model} of political orientation, which may more accurately portray the psychological motivations underlying conservatism.
Table of Contents

Chapter 1: General Introduction.............................................................................................................1

1. A Negativity Bias Among Political Psychologists.................................................................1

2. The Psychological Study of Political Orientation.................................................................2

3. Emotional Arousal Induces Cognitive Correlates of Conservative Ideology..............4

4. Preliminary Evidence that High Arousal Emotion States Facilitate Conservatism-
    Related Constructs, Whereas Low Arousal Emotion Promotes Liberalism-Related
    Constructs........................................................................................................................................7

5. Do Individuals Who Are Physiologically Sensitive to Emotional Stimuli Endorse
    More Conservative Political Orientation? .................................................................8

6. Extremism Theory....................................................................................................................9

7. Research Overview..................................................................................................................10

Chapter 2: Study 1............................................................................................................................11

1. Introduction and Overview.....................................................................................................11

2. Method.......................................................................................................................................11

3. Results.......................................................................................................................................13

4. Discussion...................................................................................................................................15

Chapter 3: Study 2............................................................................................................................17

1. Introduction and Overview.....................................................................................................17

2. Method.......................................................................................................................................17

3. Results.......................................................................................................................................19
4. Discussion...........................................................................................................21

Chapter 4: Study 3....................................................................................................22

1. Introduction........................................................................................................22

2. Overview............................................................................................................23

3. Method................................................................................................................24

4. Results................................................................................................................26

5. Discussion...........................................................................................................28

Chapter 5: Study 4....................................................................................................30

1. Introduction........................................................................................................30

2. Overview............................................................................................................31

3. Method................................................................................................................31

4. Results................................................................................................................34

5. Discussion...........................................................................................................38

Chapter 6: General Discussion................................................................................40

1. Summary of Findings.........................................................................................40

2. Emotional Arousal Leads to More Conservative Political Orientation............40

3. Future Directions: Why Would Emotional Arousal Cause Conservative Shifts? .41

4. Future Directions: A Better Understanding of The Relationships Among Personality
   Traits, Emotional Arousal, and Political Orientation.............................................43

5. Future Directions: Specific Neuro-hormonal Arousal Systems.......................45

6. Future Directions: Specific Types of Conservative Thought............................47
7. Extremism Theory.................................................................47

8. Conclusion...........................................................................48
Acknowledgments

I would like to thank my advisors Michael Inzlicht and Jordan Peterson for the benefit of their wisdom over the years. In big ways and in small, they have consistently supported me in my academic journey. I will be forever grateful to them for challenging—and inspiring—me in so many ways and am grateful as well for the skills that they have taught me. I would also like to thank many others. Elizabeth Page-Gould has shown me kindness and generosity, sharing her time—and her exceptionally broad base of knowledge; Marc Fournier has been a warm and supportive mentor; my labmates, have been a pleasure to work with and I am grateful to each of them for being such good friends and for being such a supportive group. Our research assistants, as well, have been remarkably helpful in orchestrating my research program. I am also grateful to the SPA area and the Psychology Department at the University of Toronto for establishing such an intellectually stimulating environment. I feel fortunate, as well, to have spent a semester at NYU mentored by John Jost and Jay Van Bavel, who helped me further develop my ideas about arousal and political ideology. I am thankful to my external examiner, John Hibbing, for his remarkably insightful feedback. As well, I am grateful to my undergraduate advisor, Andrew Ryder, for helping me to realize my passion for research and encouraging me to pursue a PhD in Social Psychology. And last but not least, I want to thank my friends and family for their unrelenting encouragement and support.
List of Tables

Table 1. Description and arousal ratings for each emotional film clip.

Table 2. Means, Standard Deviation (SD), and number of participants (N) in each group for Study 1.

Table 3. Means, Standard Deviation (SD), and number of participants (N) in each group for Study 2.

Table 4. The first two rows of table 1 indicate the standardized arousal and valence ratings of the IAPS images used in our study, which were reported by Lang and colleagues (1997). High scores reflect more positive versus negative valence and more arousing versus less arousing content. The 3rd and 4th rows of this table report ratings of arousal and valence by participants in our own study (N=43) about a subset of 5 images from each category. High scores reflect more positive versus negative valence and more arousing versus less arousing content. The 5th and 6th rows in this table report correlations between the social conservatism scale (SCS; Henningham, 1995; Wilson & Patterson, 1968) and the ratings of arousal and valence provided by participants in our study. Finally, the 7th row of this table reports LPP amplitudes (μv), evidenced 400-700 ms post stimulus exposure at electrode Pz, during our experiment in response to each stimulus type, regardless of whether the data was collected pre or post failed experimental manipulation.
List of Figures

Figure 1. Mean agreement with political speeches among individuals who have just witnessed an arousing or neutral film clip.

Figure 2. Mean agreement with right-wing political speeches among individuals who have just witnessed a neutral film clip or an arousing film-clip with instructions to either watch naturally or to amplify emotional reactions.

Figure 3. Figure A depicts topographical maps, which demonstrate that electrodermal activity was most differentiated by negative and positive stimuli, in the time window of the feedback related negativity (FRN), 200-350 ms post stimuli exposure, at fronto-centro electrodes: FZ, FCZ, and CZ. Figure B depicts the FRN amplitude, evidenced 200-350 ms post exposure in response to positive and negative feedback, and the difference score between negative and positive feedback, at each of these three electrode sites.

Figure 4. The feedback related negativity (FRN) amplitude, evidenced 200-350 ms post exposure, averaged across FZ, FCZ, and CZ electrodes, in response to positive and negative feedback (Figure A) and the difference scores between negative and positive feedback (Figure B), for participants with above and below the median scores on the system justification (SJ) scale (Kay & Jost, 2003).

Figure 5. Scatterplots depict the relationship between scores on the system justification scale (Kay & Jost, 2003) and the feedback related negativity (FRN) amplitude, averaged across electrode sites FZ, FCZ, and CZ, evidenced 200-350 ms post exposure, in response to positive feedback (Figure A), negative feedback (Figure B), and the difference scores between negative and positive feedback (Figure C). 95% confidence intervals are displayed.

Figure 6. Figure A depicts topographical maps that demonstrate that electrodermal activity was most differentiated by high and low arousal stimulus types at centro-parietal electrodes in the time window of the late positive potential (LPP), 400-700 ms post stimuli exposure. Figures B and C depict LPP waveforms at electrode Pz in response to stimuli that are either positive or negative in valence (Figure B) and that are either high or low in arousal (Figure C).
Figure 7. Figure A depicts the estimated marginal means of the late positive potential (LPP), evidenced 400-700 ms post-stimulus exposure at electrode Pz, in response to stimuli varying in terms of arousal and valence among participants with high and low scores on the social conservatism scale (SCS; Henningham, 1995; Wilson & Patterson, 1968). Figure B depicts the estimated marginal means of the LPP, evidenced 400-700 ms post-stimulus exposure at electrode Pz, in response to stimuli varying in terms of valence (left) and arousal (right) among participants with high and low scores on the SCS. All error bars reflect 1 SE of the mean.
Chapter 1
Introduction

1 General Introduction

1.1 A Negativity Bias among Political Psychologists

One of the fundamental assumptions of a well-functioning democracy is that the best ideas will be adopted through rational discourse and through the deliberate consideration of ideas. Yet, research over the last 60 plus years has consistently shown that political belief is colored by emotion. Undoubtedly, emotions have dramatic effects upon our perceptions, thoughts, and behaviors. Both positive and negative emotion states can lead to changes in cognitive processing style, which may shape beliefs, and in turn, affect the political stances that people endorse.

According to circumplex models of emotion (Posner, Russell, & Peterson, 2005; Russell, 1980), all affective experience may be conceived as combinations of two dimensions: 1) valence – the positive versus negative hedonic qualities of the affective state; and 2) arousal – the energized versus sleepy/calm nature of the affective state. Yet, the field of political psychology has tended to focus exclusively upon the negative pole of the valence dimension, and to ignore the arousal dimension altogether. A recent review of political psychology research conducted over the last 60+ years concluded that negatively-valenced emotion is the core emotional underpinning of conservative political orientation. This inference was based upon evidence that political conservatives, compared to liberals, exhibit a ‘negativity bias’, processing motivationally salient aversive information with heightened intensity, and that salient negative stimuli motivate conservative versus liberal shifts in political beliefs (see Hibbing, Smith, & Alford, in press; Jost, Glaser, Kruglanski, & Sulloway, 2003). However, little is known about how conservatives process motivationally salient, positively-valenced information; nor is it clear how such positively-valenced arousal affects political orientation. Thus, we have recently noted (Tritt, Inzlicht, & Peterson, in press) that further research is needed before it can be concluded that conservatism is motivated by negative valence per se, rather than arousal, more generally.
Indeed, there are compelling reasons to believe that conservatism may be motivated more fundamentally by arousal than by valance. A recent analysis of the basic emotion literature suggests that high-arousal emotional states, regardless of valence, promote cognitive rigidity, usage of heuristics, and less effortful cognitive processing, which may be compatible with particular forms of conservative political thought (Tritt, Peterson, & Inzlicht, under review). In particular, the known cognitive effects of emotional arousal may be a source of political differences in preference for the status quo, proclivity to stereotype, and tendency to make the fundamental attribution error. Negatively-valenced emotion, on the other hand (once arousal has been statistically controlled), has not been found to promote cognitive styles associated with conservatism (Tritt et al., under review). In consequence, this dissertation investigated, in a series of four studies, the hypothesis that emotional arousal, rather than negative valence per se, is an affective motivator of political conservatism. These four studies therefore tested the validity of an arousal model of political orientation, which may reflect more accurately the psychological motivations underlying conservatism than the prevailing negative valence model of political orientation.

1.2 The Psychological Study of Political Orientation

Ever since the late 18th century when supporters of the status quo sat on the right side of the French Assembly hall and opponents sat on the left, a single liberal/conservative dimension of political ideology has been discussed. Since then, the structure of political ideology has most frequently been classified along a single dimension referred to as the left/right political spectrum (See Jost, Federico, & Napier, 2009 for a review). Two aspects have been argued to comprise this left/right political divide: 1) resisting versus encouraging social change, and 2) rejecting versus accepting social inequality (See Jost et al., 2009). Identification along a single left-right ideological spectrum has been found to predict voting intentions (Jost, 2006); to be relatively stable across the lifespan (see Alwin, Cohen, & Newcomb 1991; Alwin, & Krosnick, 1991; Beck & Jennings, 1991; Fendrich & Lovoy 1988; Jennings & Niemi 1981; Markus 1986; Marwell, Aiken, & Demerath, 1987; Sears & Funk, 1999); and may have a genetic component (Alford, Funk, & Hibbing, 2005; Hatemi, Funk, Medland, Maes, Silberg, Martin, & Eaves, 2009).

For at least the last 60 years, psychologists have explored the possibility that different psychological needs enhance the appeal of left- versus right-wing ideologies. This domain of
intellectual inquiry was ignited by the publication of Adorno, Frenkl-Brunswick, Levinson, and Sanford’s *The Authoritarian Personality* in 1950. Synthesizing research and theory based largely upon the writings of Fromm (1941) and Freud (1933), the book put forward a psychodynamic conception of prototypical right-wing fascism as a psychological defense against anxiety.

Modern conceptualizations of right-wing ideology have followed in this tradition, tending to highlight the relationship between conservatism and anxiety-related negative emotions. For instance, a seminal meta-analysis of published studies involving 88 different samples taken from 12 different countries revealed that several dispositional traits, arguably related to the desire to reduce uncertainty and threat such as closed-mindedness, avoidance of uncertainty, and need for order and structure, were found to predict political conservatism (Jost et al., 2003). The authors consequently posited what has become known as the uncertainty-threat model of political belief, which stresses that emotional factors related to threat and uncertainty motivate conservative versus liberal systems of belief. In support of this model, studies have found that experimentally-induced as well as real-world threat lead to shifts toward conservative beliefs (e.g., Bonanno & Jost, 2006; McGregor, Nail, Marigold, & Kang, 2005; McGregor, Zanna, Holmes, & Spencer, 2001; Nail, McGregor, Drinkwater, Steele, & Thompson, 2009).

A large body of research has additionally suggested that conservatives are not only sensitive to threat and uncertainty but also to disgust, which is a distinct negative-valence high arousal emotion state (e.g., Anderson, Christoff, Panitz, De Rosa, & Gabrielo, 2003). Interest in the relationship between disgust and conservative ideology was ignited when Schaller and colleagues (e.g., Schaller, 2006) put forward the concept of a behavioral immune system -- a host of psychological mechanisms evolved to lead organisms to avoid contact with disease-causing parasites. According to this behavioral immune system theory, humans may feel disgust in response to people, places, and things associated with risk for contamination. In this context, certain conservative agendas such as advocating for stricter control of immigration and alternative lifestyles may be conceived as (at least partially and perhaps non-consciously) motivated by the desire to avoid pathogens. In support of this notion, experimental induction of disgust has been found to lead to conservative shifts (Horberg, Oveis, Keltner, & Cohen, 2009). More specifically, increased susceptibility to disgust has been linked to conservative attitudes towards sex (Olatunji, 2008) and sexual orientation (Inbar, Pizarro, Knobe, & Bloom, 2009),
tolerance of social inequality and authoritarianism (Hodson & Costello, 2007), and conservative political orientation, more generally (Inbar, Pizarro, & Bloom, 2009).

While a great deal of research in the field of political psychology has focused upon the relationship between conservatism and negatively-valenced emotion, the role of positively-valenced emotion in shaping political thoughts or belief systems – or the role of emotional arousal, more generally – remains unexplored. Given that emotion tends to be classified along two dimensions, valence and arousal, understanding of the emotional underpinnings of political ideology remains incomplete. Exclusive focus upon valence, without considering arousal, is problematic because arousal and valence have often been confounded. Studies have found, for instance, that aversive emotional manipulations such as threat (e.g., Bonanno & Jost, 2006; McGregor et al., 2001, 2005; Nail et al., 2009) and disgust (Hodson & Costello, 2007; Horberg et al., 2009; Inbar et al., 2009) lead to conservative shifts in beliefs. However, without assessing the impact of arousing positively-valenced stimuli, it is unknown whether negative valence or arousal lies at the root of these conservative shifts. A single experimental study has assessed the impact of positively-valenced stimuli, happy faces, upon political orientation, and found that such stimuli led participants to endorse more liberal views (Lodge & Taber, in press). Yet because happy faces appear less motivationally salient/arousing than unhappy/angry faces (e.g., Hansen & Hansen 1988), it nonetheless remains unclear whether valence or arousal underlie such findings. Further research is necessary to disentangle the effects of arousal and valence before it can be definitively concluded that negative emotion per se underlies variations in political ideology. In fact, not only is it conceivable that the effects of arousal and valence have been confounded in past studies, but compelling research stemming from the field of affective science suggests that emotional arousal – regardless of the valence of that arousal – may promote cognitive processing styles that, at least in some contexts, seem to enhance the appeal of conservative ideology.

1.3 Emotional Arousal Induces Cognitive Correlates of Conservative Ideology

Highly emotionally-arousing states -- whether positive or negative – can produce similar alterations in cognitive processing, including 1) promotion of cognitive rigidity, 2) inhibition of
effortful cognitive processing, 3) enhanced use of heuristics, and 4) mindless engagement in dominant response tendencies or habits. These cognitive processing styles appear similar to certain aspects of conservative thought, such as preference for the status quo, proclivity to stereotype, and tendency to commit the fundamental attribution error. Each of these cognitive consequences of emotional arousal will be discussed in turn, in relation to cognitive correlates of conservative ideology.

First, emotional arousal may stimulate cognitive rigidity, which is associated with conservative ideology. One of the most replicable findings in the field of political psychology is that conservatives are more cognitively rigid than liberals (see Jost et al., 2003). Furthermore, rigidity versus flexibility has been correlated with political conservatism versus liberalism (Sidanius, 1978, 1985; Kemmelmeier, 2007). Emotional arousal (but not valence) has, likewise, been consistently found to lead participants to manifest cognitive rigidity, versus flexibility, on various cognitive tasks (Braem, Verguts, & Notebaert, 2011; Demanet, Liefooghe, & Verbruggen, 2011; see also Hebb, 1949; Verguts & Notebaert, 2009), while political conservatism versus liberalism has been linked to cognitive-inflexibility related constructs such as intolerance of ambiguity (e.g., Jost, Napier, Thorisdottir, Gosling, Palfai, & Ostafin, 2007; Sidanius, 1978; see Rock & Janoff-Bulman, 2010; see Jost et al., 2003), reduced openness to experience (e.g., Leone & Chirumbolo, 2008; Hirsh et al., 2010; van Hiel & Mervielde, 2004; see Jost et al., 2003), greater need for order and structure (e.g., Altmeyer, 1998; Jost et al., 2007; see Jost et al., 2003), and need for cognitive closure (e.g., Chirumbolo, Areni, & Sensales, 2004; Jost et al., 2007; Kemmelmeier, 1997; Webster & Kruglanski, 1994; see Jost et al., 2003). Thus, if emotional arousal promotes rigidity, it might well promote conservative versus liberal political orientation.

Second, emotional arousal may promote a low-effort style of cognitive processing, which may lead individuals to prefer conservative political ideology. Emotionally arousing stimuli have been found to evoke activity in brain regions such as the amygdala and ventrolateral prefrontal cortex, which are associated with deactivation in the working memory regions such as the dorsolateral prefrontal cortex (e.g., Dolcos & McCarthy, 2006; Drevets & Raichle, 1998), and with hindered performance on demanding cognitive tasks (Drevets & Raichle, 1998). Critically, it seems that arousal, rather than negative valence per se, underlies such interference (De Houwer & Tibboel, 2010; Schimmack, 2005; Verbruggen & De Houwer, 2007; see also Buodo,
Sarlo, & Palomba, 2002). Some have argued, in particular, that high-arousal emotional states distract individuals from effortful and reflective thought processing (see Strack & Deutsch, 2004). At the trait level, a great deal of evidence suggests that conservatives engage in less effortful cognitive activities than liberals (see Jost et al., 2003 for review; Sargent, 2004). Furthermore, experimental induction of low-effort thinking styles does appear to lead to conservative shifts in political orientation (Eidelman, Crandall, Goodman, & Blanchar, 2012). Conservatives have been found to report low need for cognition, a construct defined as enjoyment of effortful cognitive activity (Sargent, 2004). Individuals high in need of cognition like to argue and tend to change their opinions if presented with strong arguments, whereas those low in need for cognition avoid such activities and are often less affected by argument strength (see Cacioppo, Petty, Feinstein, & Jarvis, 1996; Sargent, 2004). Those in the latter category also tend to rely on low-effort judgment strategies (Cacioppo et al., 1996). Consistent with the idea that conservatives have less need for cognition than liberals, a large body of literature suggests right-wing political speeches are less cognitively complex than left-wing political speeches (e.g., Gruenfeld, 1995; Sidanius, 1985, Tetlock, 1983, 1984; see Jost et al., 2003 for review). Taken together, it seems that emotional arousal promotes a low-effort cognitive style, which may facilitate conservative orientation.

Third, arousal leads individuals to rely on heuristics rather than to consider information in its context. Stereotypes, for instance -- which have been conceived as judgment heuristics (e.g., Bodenhausen & Wyer, 1985; also see Cuddy & Fiske, 2002; Fiske & Neuberg, 1990) -- are endorsed more frequently among individuals in an aroused state (e.g., Bodenhausen, 1990, 1993; Lambert et al., 2003; Paulhus & Lim, 1994; see Strack & Deutsch, 2004). The use of social stereotypes is associated with conservative ideology (Jost & Banaji, 1994), and with conservative-related proclivities such as need for cognitive closure (e.g., Kruglanski & Freund, 1983) and structure (Schaller, Boyd, Yohannes, & O’Brien). The tendency to overestimate dispositional effects and to underestimate situational factors contributing to an aspect of social behavior or outcome is related to stereotyping. This fundamental attribution error is also characteristically associated with conservative ideology. For instance, conservatives, compared to liberals, are more inclined to make dispositional attributions in domains such as obesity (Crandall, 1994), misfortune (Williams, 1984), poverty (Zucker & Weiner, 1993), unemployment (Feather, 1985), and intelligence (Skitka, Mullen, Griffin, Hutchinson, &
Chamberlin, 2002). Indeed, conservatives generally tend to emphasize self-reliance and personal responsibility (e.g., Skitka & Tetlock, 1992). The tendency to make dispositional versus situational attributions (like stereotyping) has been found to be facilitated by cognitive load (Gilbert, Pelham, & Krull, 1988), which suggests that it may be enhanced by low-effort cognitive processing.

Finally, high-arousal emotional states can lead individuals to engage in dominant, well-ingrained response tendencies (Hull, 1943; Zajonc, 1965; see Strack & Deutsch, 2004) (i.e., to go along with whatever is most habitual or familiar). If arousal leads individuals to engage in habitual response tendencies, then it might also incline them to justify the prevailing, familiar socio-political status quo. By contrast, low-arousal states might lead individuals to consider novel, alternative socio-political systems. System justification is in fact a fundamental characteristic of conservative ideology (Jost & Banaji, 1994).

In sum, emotional arousal (regardless of valence) promotes a rigid, low-effort cognitive processing style, associated with use of heuristics and reliance upon dominant response tendencies and beliefs. These cognitive short-cuts, necessitated or made more likely by emotional arousal, appear importantly similar to elements of conservative thought such as endorsement of the status quo, cognitive rigidity, proclivity to stereotype and to make the fundamental attribution error, and preference for low-effort thinking. Taken together, it seems plausible that emotional arousal might well promote politically conservative thinking styles and conclusions.

1.4 Preliminary Evidence that High Arousal Emotion States Facilitate Conservatism-Related Constructs, Whereas Low Arousal Emotion Promotes Liberalism-Related Constructs

Harsher moral condemnation of law-breakers is a characteristic of conservative ideology (e.g., Haidt & Graham, 2007). As might be expected if emotional arousal enhances conservatism, experimental induction of high-arousal emotion states, both positive and negative, lead participants to increase the severity of punitive judgments (Cheng, Ottati, & Price, 2012). Low-arousal emotion states, conversely, may encourage liberal thinking. The idea that more resources should go to welfare assistance is frequently promoted by liberal political parties, and this belief
has been found to be enhanced by induction of low versus high arousal negative emotion-states (Small & Lerner, 2008). The tendency to positively evaluate out-group members and to exhibit reduced social stereotyping, another characteristic associated with liberalism, is enhanced by low arousal emotion states – both positive (Dovidio, Gaertner, Isen, & Lowrance, 1995; Urada & Miller, 2000) and negative (Forgas, 2011). Nonetheless, studies have not yet assessed whether experimentally-induced emotional arousal – both positive and negative in valence – will specifically cause conservative shifts in thought and attitude. This is the focus of Studies 1 and 2, below.

1.5 Are Individuals Who Are Physiologically Sensitive to Emotional Stimuli more Conservatively Oriented?

If emotional arousal, *per se*, can make conservative ideas more attractive, then people with higher degrees of non-specific emotional reactivity might be more likely to endorse conservative ideologies. This is not what has been concluded in the relevant literature, however: social scientists have assumed for decades that conservatives are characterized by enhanced sensitivity to specifically negative information (see Hibbing et al., in press for recent review).

However, the idea that conservatives might exhibit more generalized sensitivity to emotion is consistent with recent neurobiological study findings. Enhanced volume (Kanai, Feilden, Firth, & Rees, 2011) and activity (Schreiber et al., 2013) of the amygdala has, for example, been found among conservatives. These findings are generally considered to support the negative-emotion sensitivity hypothesis of political conservatism. However, this conclusion rests on the assumption that the amygdala is responsive to threat – and threat alone. Yet the amygdala responds to appetitive, novel, rare, and more generally motivationally relevant cues, as well as those that are aversive (see Cunningham & Brosch, 2012 for a review).

Psychophysiological studies of emotional bias among conservatives are similarly inconclusive. Such studies have been interpreted as evidence of sensitivity to negatively-valenced stimuli (see Hibbing et al., in press for review), even though they have not included arousing, non-negatively-valenced control conditions. Researchers have either assessed how individuals process negative compared to neutral information (Dodd et al., 2012; Fodor, Wick, Hartsen, & Preve, 2008; Oxley et al., 2008; Smith, Oxley, Hibbing, Alford, & Hibbing, 2011) or
the way participants processed highly-arousing negative compared to less-arousing positively
valenced information – thus confounding the effect of arousal and valence (Carraro, Castelli, &
Macchiella, 2011; Dodd et al., 2012; McLean et al., in press), as described previously (Tritt et
al., in press). Without the inclusion of equally arousing positive and negative stimuli, the
findings in these studies remain questionable.

Moreover, if political conservatism is fundamentally associated with sensitivity to
negative valence, specifically, then it should be at least somewhat positively correlated with
neuroticism, a personality trait that clearly subsumes fear, anxiety, and aversion to uncertainty
(e.g., Hirsh & Inzlicht, 2008; Jardine, Martin, Henderson, & Rao, 2005). Many studies have now
demonstrated, however, that neuroticism is not linked to political belief in any particular
direction or with any real power (e.g., Alford & Hibbing, 2007; Butler, 2000; Carney, Jost,
Gosling, & Potter, 2008; Hirsh, DeYoung, Xu, & Peterson, 2010). Not only are conservatives no
more neurotic than liberals, but several studies have found that conservatives are actually happier
than liberals (e.g., Napier & Jost, 2008; Schlenker, Chambers, & Le, 2012; Taylor, Funk, &
Craighill, 2006). This research suggests that conservatives experience more positive
psychological states, including happiness, more often than liberals. Perhaps conservatives’
cognitive defenses are so effective that their true differential susceptibility to anxiety and etc. is
reversed, but it would require very strong evidence to explain away evidence that on its face
seems to indicate rather directly that such a differential may simply not exist. Studies 3 and 4
therefore examine whether conservatism is associated with physiological sensitivity to positive
and negative stimuli, thus at last partially redressing the lack of research examining
conservatives’ reaction to salient, positively-valenced stimuli per se.

1.6 Extremism theory

Ever since Adorno and colleagues (1950) came out with their synopsis of the
authoritarian personality, the validity of examining the psychological correlates of right versus
left-wing political orientation has been contested. Shils (1954) was the first to suggest the
possibility that those on the extreme left, like those on the extreme right, might be conceived as
fascists (see also Eysenck, 1954). This extremism hypothesis, championed more recently by
Greenberg and Jonas (2003), suggests that political beliefs of any kind serve similar
psychological functions and that ideological extremity rather than orientation, per se, is
emotionally motivated. While the central purpose of my dissertation is to explore whether arousal – or negative valence – promotes conservative versus liberal orientation, I also assess the validity of the extremism hypothesis in each of my dissertation studies by examining the effects of extremism versus orientation in all analyses.

1.7 Research Overview

The following set of four studies assesses two hypotheses about the emotional underpinnings of political conservatism: 1) that positively-valenced emotional arousal, like threat and disgust, will cause conservative shifts in political orientation, and 2) that individuals who experience enhanced physiological sensitivity to pleasant as well as unpleasant emotional experience will report more conservative political orientation. In total, these studies were designed to test the hypothesis that emotional arousal, in general – rather than sensitivity to negative emotion, *per se* – constitutes an important affective substrate of conservative (versus liberal) thought.
2 Study 1

2.1 Study 1 – Introduction and Overview

Participants in Study 1 were exposed to one of several film clips designed to produce a variety of states of arousal, or one of several neutral film clips, and then asked to indicate their subsequent agreement with a variety of right or left-wing political speeches. If the hypothesis of sensitivity to negative valence is correct, then threatening film-clips, compared to film-clips that elicit other emotions, or neutral film clips, should increase agreement with subsequently presented right-wing speeches. If political conservatism is motivated by arousal, more broadly, then a range of emotionally-arousing, compared with neutral film-clips, should lead to increased agreement with subsequently presented right-wing political speeches. By the same logic, emotionally-charged film clips, compared to their neutral counterparts, might be expected to decrease agreement with left-wing speeches, as left and right political views have traditionally been thought to form opposite ends of a single dimension (see Jost et al., 2009 for a review).

2.2 Study 1 – Method

Participants. 578 American participants were recruited from Amazon’s Mechanical Turk (MT), an online platform for enlisting workers, and each was compensated $1.20 for participation in the study. Participants recruited from MT are more representative of the United States population than traditional subject pools (i.e., undergraduate samples) with regards to gender, race, age, and education (Berinsky, Huber, & Lenz, 2012; Gosling, Vazire, Srivastava, & John, 2004; Krantz & Dalal, 2000; Paolacci & Chandler, 2010). Due to attrition – expected in lengthy MT studies – a final sample of 442 completed the study, in its entirety (240 males with a mean age of 31.91 years; $SD = 23.37$; range 18-78).

Political orientation. Baseline political orientation was assessed with the question, used by other researchers: “Please rate yourself on a scale ranging from 1 (liberal) to 7 (conservative)”
(e.g., Jost et al., 2009; Thorisdottir, Jost, Liviatan, & Shrout, 2007). The sample mean was 3.50 (SD=1.84).

Procedure. The study employed a between-groups design. Participants were randomly assigned to watch either an emotion-inducing or a neutral film clip and then to read either left-wing or right-wing content speeches. Participants rated their level of agreement with political speeches using a 9-point Likert scale ranging from 1 (I do not agree at all) to 9 (I completely agree).

The research protocol was approved by the University of Toronto ethics board. All participants gave their consent before beginning the online survey.

Film clips. Participants were randomly assigned to view a film clip that was frightening, amusing, disgusting, or neutral, in order to induce emotional arousal or neutral affect. A between-groups design was used to eliminate carry-over effects of different types of emotional arousal. To ensure that the effects were not stimulus-specific, we used three different film clips of each type. Each of the film clips has been used previously to induce a specific emotional reaction (Gross & Levenson, 1995; Rottenberg, Ray, & Gross, 2007; Schaefer, Nils, Sanchez, & Philippot, 2010). See Table 1 for a description of each clip.

Each of the clips has been given a published self-report arousal rating (Gross & Levenson, 1995; Rottenberg et al., 2007; Schaefer et al., 2010). Film-clips taken from Schaefer et al. (2010) were rated on a 7-point Likert Scale ranging from 1 (not at all arousing) to 7 (extremely arousing), whereas film-clips identified in Gross and Levenson (1995) and Rottenberg et al. (2007) were rated on 9-point Likert Scales ranging from 0 (not at all arousing) to 8 (extremely arousing). To account for the use of different rating scales, we Z-scored the film clip arousal ratings (listed in Table 1). A one-way ANOVA was conducted to see if the film-clips differed in standardized arousal ratings ($F(3,9)=22.20$, $p=.001$). This analysis was followed by post-hoc LSD tests to determine which specific stimulus types differed in arousal. Amusing film-clips ($M=.42$; $SD=.48$) did not differ significantly in arousal ratings from the scary ($M=.30$; $SD=.27$) or disgusting ($M=.81$; $SD=.41$) film-clips, $M_{dif}=.11$, $SE=.31$, $p=.725$, $M_{dif}=-.40$, $SE=.31$, $p=.239$, respectively. Moreover, the disgusting and scary film-clips did not differ from each other in arousal ratings, $M_{dif}=.51$, $SE=.31$, $p=.140$. However, neutral film-clips ($M=-1.53$; $SD=.35$)
were rated as significantly less arousing than amusing, scary, or disgusting film-clips, $M_{d}=1.94$, $SE=0.31$, $p=0.001$, $M_{d}=1.83$, $SE=0.31$, $p=0.001$, $M_{d}=2.35$, $SE=0.31$, $p=0.001$, respectively.

**Speeches.** We used real left and right wing political speeches as ecologically-valid dependent variables. The speeches were found online by conducting Google searches for each of four topics (the war on terror, gay marriage, stem cell research, and immigration) and choosing ones written by prominent left- or right- wing politicians who adopted a clear topic-related ideological stance on an issue. These topics were chosen because they are considered important issues dividing the political left and right (Dombrink, 2006). Participants read four political speeches, to ensure the generalizability of the results to political orientation, rather than to narrower identification with a topic-specific opinion. The speeches were not labeled as right- or left-wing, and it was not apparent which politician had written which speech. The speeches were between 800 and 2000 words ($M=1744.5; SD=920$). The right and left wing speeches did not differ significantly in overall mean length ($t(3)=2.15$, $p>.05$). Speeches were counter-balanced in their presentation. In a pilot test, 51 participants were asked to indicate “how complex are the ideas outlined in this political speech” on a 9-point Likert scale ranging from 1 (not at all complex) to 9 (extremely complex). The right-wing ($M=4.42, SD=1.86$) and left-wing ($M=3.96, SD=2.18$) did not differ significantly in complexity, $t(50)=-1.81$, $p>.05$, Cohen’s $d=.22$.

### 2.3 Study 1 – Results

Although we recruited an equal number of participants in each experimental condition, because of attrition, the sample sizes were not exactly equal. Between 50-63 participants were ultimately included in each condition (see Table 2).

We conducted a univariate analysis of variance (ANOVA) that assessed to what degree (1) experimental condition (i.e., witnessing an amusing, frightening, disgusting, or neutral film clip), (2) right- versus left-wing content of speech, (3) baseline political orientation, and (4) the interactions among these factors, would predict agreement with political speeches. Partial eta-squared effect sizes were examined for all ANOVA analyses.

**Main effects.** We first examined the basic main effects of baseline political orientation, speech type, and film type upon general agreement with political speeches. An overall main effect of *a priori* political orientation upon agreement with political speeches (regardless of
right-wing or left-wing content) was not found, $F(1,441)=.17, p= .685, \eta^2<.01$. A main effect for speech type emerged, $F(1,441)=251.37, p=.001, \eta^2=.37$, such that participants tended to agree more, overall, with left- ($M=6.35; SE=.13$) compared to right-wing ($M=4.97; SE=.13$) speeches. This is consistent with previous findings that participants recruited through MT tend to be more left-leaning (e.g., Berinsky et al., 2012).

A main effect of film type on agreement with political speeches also emerged ($F(1,439)=5.06, p=.002, \eta^2=.03$). LSD post-hoc tests revealed that the three different types of emotion-inducing films (compared to neutral film-clips) each elicited significantly greater endorsement with political speeches, $M_{diff}=-.81; SE=.21; p=.001; M_{diff}=-1.02; SE=.21; p=.001; M_{diff}=-1.02; SE=.21; p=.001$, for disgusting, scary, and amusing, respectively. However, the three different types of emotion-inducing film-clips did not differ in their capacity to alter agreement with political speeches ($ps>.05$). Emotional arousal therefore led participants to agree more with speeches, in general – a find that appears consistent with research that has suggested that arousal tends to enhance general “liking” of stimuli (e.g., Vettehen, Nuijten, & Peeters, 2008; Yoon, Bolls, & Lang, 1998).

**Interactions.** An interaction emerged between baseline political orientation and left-versus right-wing content in predicting agreement with political speeches, $F(1,441)=176.92, p=.001, \eta^2=.29$, such that more conservative vs liberal participants preferred right- versus left-wing speeches. Political orientation and experimental condition did not interact to predict agreement with political speeches, $F(1,439)=.72, p=.542, \eta^2=.01$.

A significant interaction between the effect of film type and left- versus right-wing content upon agreement with political speeches also emerged, $F(1,439)=5.25, p=.001, \eta^2=.04$. Follow up post-hoc LSD tests suggested that, as specified in our main hypothesis, each type of emotional film clip was associated with enhanced agreement with right-wing speeches compared to neutral film clips ($M_{diff}=-1.33; SE=.31; p=.001; M_{diff}=-1.71; SE=.30; p=.001; M_{diff}=-1.78; SE=.21; p=.001$, for disgusting, scary, and amusing, respectively; See Table 2; Figure 1). None of the emotional stimulus types differed significantly in terms of their ability to heighten agreement with right-wing speeches ($ps >.05$). Different types of film-clips did not, however, elicit significantly altered magnitudes of agreement with left-wing speeches ($ps >.05$) (see Table 2; Figure 1). These findings are consistent with the notion that watching an arousing film clip
leads to enhanced agreement with right-wing political speeches compared to watching a neutral film-clip, while controlling for the effect of baseline political orientation. However, arousal did not decrease endorsement of left-wing content.

A 3-way interaction between baseline political orientation, type of film-clip witnessed, and right- versus left-wing content, was not found to predict agreement with political speeches, $F(1,439)=1.82, p=.143, \eta^2=.01$. This suggests that the experimental manipulation did not differentially affect liberals and conservatives.

We re-ran our analyses, this time analyzing the specific arousal ratings listed in Table 1 rather than the four different valence categories of film-clips (i.e., neutral, fear, amusement, disgust). A main effect of arousal upon agreement with political speeches was noted, $F(1,441)=2.05, p=.024, \eta^2=.07$, once again suggesting that arousal may enhance overall agreement with political speeches. Arousal did not interact with baseline political orientation to predict overall agreement with political speeches, $F(1,441)=1.09, p=.313, \eta^2=.19$.

However, in keeping with the main hypothesis, a significant interaction emerged between arousal and endorsement of right-versus left-wing speeches, $F(1,441)=4.76, p=.001, \eta^2=.14$, such that arousal was associated with enhanced agreement with right- ($F(1,441)=6.68, p=.001, \eta^2=.31$) but not left-wing ($F(1,441)=.76, p=.679, \eta^2=.06$) speeches. This analysis provides further evidence that arousal modulates agreement with right-wing speeches, specifically.

No 3-way emerged, as before, between baseline political orientation, experimental condition, and right versus left-wing content, $F(1,441)=1.17, p=.222, \eta^2=.15$. This provides further evidence that the experimental manipulation did not differentially impact liberals and conservatives.

2.4 Study 1 – Discussion

In Study 1, participants watched positive, negative, or neutral film clips to determine how emotional might alter agreement with multiple speeches of left- and right-wing ideological content. Three different film-clips of each emotion type were used, and endorsement of speeches about a variety of political topics were assessed to ensure that the effects were not stimulus-specific. Study 1 indicated that diverse types of positive as well as negative emotional arousal
states were linked to enhanced agreement with right-, but not left-wing political speeches. These findings support the hypothesis that arousal, rather than negative valence, may underlie the conservative shifts in political beliefs that have been found to follow from experimental induction of threat (e.g., Bonanno & Jost, 2006; McGregor et al., 2001, 2005) and disgust (e.g., Hodson & Costello, 2007; Horberg et al., 2009; Inbar et al., 2009). Threat (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Cacioppo, Gardner, & Berntson, 1999; Smith, Cacioppo, Larsen, & Chartrand, 2003), as well as disgust (see Schnall, Haidt, Clore, & Jordan, 2008) are widely identified as highly-arousing, as well as unpleasant, emotions (as well as negative). Thus, researchers may have prematurely assumed that conservative shifts were caused by negative valence rather than by arousal.

Study 1 did not reveal any effect of arousal upon endorsement of liberal speeches, and it remains unclear why. If political orientation is best represented along a single dimension ranging from liberalism to conservatism, then we would expect that if arousal enhances conservative political beliefs, it should also reduce liberal political beliefs. Alternatively, however, arousal may affect attitude toward conservative speeches, without altering such towards liberal speeches. This explanation may be valid if political orientation is not best represented by a single dimension ranging from liberalism to conservatism. Indeed, a number of authors have argued that political orientation is not best represented by a single dimension, but that left and right represent two independent, unipolar dimensions (e.g., Conover & Feldman 1981, Kerlinger 1984). In support of this notion, exploratory and confirmatory factor analyses have suggested that evaluation of left and right wing ideas load onto different latent variables that are at least somewhat independent of each other (see Jost et al., 2009). Thus, it is conceivable that emotionally arousing films might induce agreement with right-wing speeches, without affecting endorsement of left-wing speeches.

Finally, Study 1 does not support the extremism hypothesis (Greenberg & Jonas, 2002). According to such theories, threat should motivate extreme political beliefs, regardless of orientation, such that liberals become more extreme in their liberalism and conservatives more entrenched in their conservatism. We did not find an interaction between baseline political beliefs and experimental induction of positive, negative, or neutral affect. Rather, an overall effect was noted in which emotional arousal enhanced agreement with specifically right-wing political content.
3 Study 2

3.1 Study 2 – Introduction and Overview

Study 1 suggested that political conservatism is motivated by positively- as well as negatively-valenced emotional arousal, and was thus more broadly and simply motivated than previously assumed. Study 2 was designed, similarly, to determine whether the induction of positive and negative emotional states would lead to conservative shifts in beliefs, controlling for baseline political affiliation. As in Study 1, participants in Study 2 were asked to view a positive, negative, or neutral film-clip, and then to read – and rate their agreement with – a number of political speeches. This time, however, participants who viewed an emotionally arousing film-clip were either asked to amplify their emotional reactions to the emotional film-clip or to watch the emotional film-clip as they normally would. Instructions to amplify emotional reactions to positive and negative film-clip-stimuli has been found to enhance the emotional experience, emotion-expressive behavior, and autonomic responses, associated with the affective content of film-clips, compared to conditions when participants are instructed to watch such film-clip-stimuli naturally (Giulian, McRae, & Gross, 2008). We therefore hypothesized that if emotional arousal leads to the endorsement of conservative political ideology, participants instructed to amplify their emotional reactions to positive and negative emotion-inducing film-clips should endorse conservative political beliefs more strongly than those instructed to watch such film-clips naturally. Only right-wing content speeches were employed in Study 2, because arousal was not found to modulate agreement with left-wing political speeches in Study 1.

3.2 Study 2 -- Method

Participants. 350 American participants were recruited through MT and were compensated $1.40 for their time. Due to attrition, complete data was obtained for 277 participants (129 males; mean age = 31.23 years; SD = 11.50; range = 18-70).
**Political orientation.** Baseline political orientation was assessed with the same item employed in Studies 3. The sample mean was 3.67 ($SD = 1.70$).

**Procedure.** The research protocol was approved by the University of Toronto ethics board. All participants gave their consent before beginning the online survey.

Study 2, like Study 1, employed a between-groups design. Participants were randomly assigned to watch either an emotion-inducing (amusing or scary) or a neutral film clip and then to read right-wing content speeches.

The right-wing content speeches, speech rating scales, and film clips (amusing, scary and neutral) were the same ones used in Study 1. This time, we did not administer any disgust-inducing emotional film-clips, because such clips did not yield magnitudes of conservative shift in political beliefs in Study 1 that were significantly different from those elicited by fear or amusement inducing film-clips. As in Study 1, Study 2 used three different film clips of each type to ensure that the effects were not stimulus-specific.

Participants who were assigned to watch a neutral film clip received no instructions. Those who were assigned to watch an emotional film-clip were randomly assigned to either amplify their reactions to that film-clip or to watch the film-clip naturally. The instructions, modified from Gross & Levenson (1995), are as follows:

*Natural film-clip:* You are about to be directed to watch an anxiety-provoking [pleasant] video clip. It is quite normal that viewing such a clip will create some level of discomfort or fear [amusement]. Please try to experience your feelings without trying to control or change them in any way. Please let your feelings run their natural course.

*Amplify film-clip:* You are about to be directed to watch an anxiety-provoking [pleasant] video clip. It is quite normal that viewing such a clip will create some level of discomfort or fear [amusement]. Please try to amplify your feelings as you view the film clip. Please behave in such a way that a person watching you would know you were feeling scared [amused].

We opted to modify the paradigm employed by Gross & Levenson (1995) as little as possible, as it has previously been found to successfully manipulate emotional intensity. For this reason, participants were warned about the type of film-clip that they were about to watch.
(amusing or anxiety-provoking) in replication of Gross & Levenson (1995), even though this may have produced some priming effects.

3.3 Study 2 -- Results

Although we recruited an equal number of participants in each experimental condition, not all participants completed the study and so the sample sizes were not exactly equal. Between 42-70 participants were ultimately included in each condition (see Table 3).

We conducted two ANOVAs that assessed (1) whether watching a positive, negative, or neutral film-clip would predict agreement with right-wing speeches while controlling for the effect of baseline political orientation, and (2) whether valence (positive vs. negative), instructional manipulation (amplify vs. watch naturally), and an interaction between these two factors, would predict agreement with right-wing speeches while controlling for the effect of baseline political orientation (among participants who watched an emotional film-clip). Partial eta-squared effect sizes were examined for all ANOVA analyses.

In the first analysis, experimental condition (positive vs. negative vs. neutral) and baseline political orientation were entered into the model as factors. We assessed whether these two variables, and/or an interaction between them, would predict mean agreement with right-wing political speeches. Not surprisingly, a main effect was noted, such that baseline political orientation predicted agreement with right-wing speeches, $F(1,277)=19.30, p=.001, \eta^2=.14$. Moreover, a main effect of experimental condition emerged, $F(1,275)=3.55, p=.032, \eta^2=.06$. Follow-up post-hoc LSD tests revealed that, in replication of Study 1, watching an arousing film-clip – whether positive or negative – elicited significantly greater agreement with right-wing speeches, compared with watching a neutral film-clip, controlling for baseline political orientation, ($M_{diff}=-2.28; SE=.36; p=.001; M_{diff}=-2.58; SE=.35; p=.001$, for negative and positive, respectively). Also in replication of Study 1, positive and negative film clips did not elicit significantly different magnitudes of agreement with right-wing speeches, $M_{diff}=-.30; SE=.33; p=.367$. Finally, in replication of Study 1, baseline political orientation did not interact with the experimental manipulation to predict agreement with right-wing speeches, $F(1,275)=.43, p=.650, \eta^2=.01$. 

19
In our second analysis, valence (positive vs. negative), instructional manipulation (amplify vs. accept), and baseline political orientation were included in the model as factors. We assessed whether these variables, and/or interactions among them would predict mean agreement with right-wing political speeches.

Baseline political orientation indeed significantly predicted agreement with right-wing speeches, $F(1,277)=24.61, p=.001, \eta^2=.11$. A different trend for a main effect was also noted: positively-valenced film clips may have elicited more agreement with right-wing speeches than negatively-valenced film clips, $F(1,277)=3.50, p=.063, \eta^2=.02$. See Figure 2 and Table 3 for means and SDs.

Instructional manipulation also produced a significant main effect: voluntary amplification of reactions to emotional film-clips produced more agreement with right-wing content than natural watching, $F(4,275)=21.36, p=.001, \eta^2=.10$. Unexpectedly, we also noted a significant interaction between valence and instructional manipulation, $F(1,275)=9.34, p=.003, \eta^2=.04$. Post-hoc LSD tests revealed that participants who were instructed to enhance their emotional reactions to the negative film-clips agreed more with the right-wing film-clips than participants who were instructed to watch the negative film clips naturally, $M_{diff}=-1.66; SE=.33; p=.001$. On the other hand, participants who watched positive film-clips agreed with the right-wing speeches to the same extent regardless of whether they did or did not amplify their emotional responses, $M_{diff}=-.31; SE=.29; p=.290$. (See Figure 9 and Table 4 for mean levels of agreement with right-wing political speeches for each condition). Thus, although amplifying emotional arousal tended to elicit more agreement with right-wing speeches, this effect seemed limited to negatively-valenced clips. We did not anticipate this, but wonder if it was caused by a ceiling effect. Participants who watched amusing film clips seemed to agree with the right-wing speeches at a rather high level, even when they watched the film naturally.

Finally, we noted that baseline political orientation did not interact with the amplify/watch naturally experimental manipulation, $F(1,275)=1.98, p=.161, \eta^2=.01$, nor was there a 3-way interaction between baseline political orientation, instructional manipulation, and valence of film-clip watched, $F(1,275)=.12, p=.843, \eta^2<.01$. Once again, this suggests that our experimental manipulation did not differentially affect liberals and conservatives.
3.4 Study 2 – Discussion

As in Study 1, participants in Study 2 watched film clips previously shown to elicit positive, negative, or neutral affect so that their impact upon agreement with multiple speeches of left- and right-wing ideological content could be assessed. Both positive and negative clips induced enhanced agreement with right- but not left-wing political speeches compared to neutral clips. These findings provide further support for the notion that conservative political orientation is motivated more broadly than previously considered given the emphasis current theories place upon the relationship between ideology and specifically aversive states such as threat and disgust (e.g., Jost et al., 2007; McGregor et al., 2001, 2005; Nail et al., 2009; Hodson & Costello, 2007; Inbar et al., 2009; see Jost et al., 2003; Hibbing et al., in press for reviews). Furthermore, the findings of study 2 extended those of Study 1, suggesting that voluntary amplification of emotional reactions to arousing film-clips tended to elicit more agreement with right-wing speeches than watching such stimuli naturally. This effect, however, seemed limited to negatively-valenced clips. Perhaps this was caused by a ceiling effect, with regards to the effects of positive emotion: participants who watched amusing film clips agreed with the right-wing speeches at a rather high level, even when they watched the film naturally.

In any case, Study 2 replicated the central finding of Study 1, which is that positive as well as negative emotional arousal led to conservative shifts in beliefs. If general emotional arousal (including that induced by positive emotion) indeed induces conservative shifts in political orientation, then individuals who experience heightened physiological sensitivity to positive stimuli might report more conservative political ideology. This hypothesis was tested in Study 3.

Once again, our experimental manipulation did not differentially affect liberals and conservatives. This does not support the extremism hypothesis (Greenberg & Jonas, 2002), which suggests that threat should lead liberals to become more extreme in their liberalism and conservatives more extreme in their conservatism.
Chapter 4
Study 3

4 Study 3

4.1 Study 3 – Introduction

Little is known about how conservatives process motivationally salient, positive information. If conservatives exhibit sensitivity to emotional stimuli in general, rather than to negativity *per se*, then they should perhaps exhibit heightened electrophysiological sensitivity to positive stimuli. Study 3 assessed this hypothesis, using event related potential (ERP) technology to assess neural processing of positive and negative feedback.

The ERP technique indexes early and fast voltage changes in populations of neurons as they fire in response to a specific event (e.g., presentation of a stimulus) at electrode sites placed on the scalp (Luck, 2005). We examined, in particular, the feedback related negativity (FRN), an ERP that indexes neural activity in reward-processing brain regions, in response to positive as well as negative task-related feedback. The FRN is generated in the medial prefrontal cortex, approximately 250-400 ms after such feedback (e.g., Carlson, Foti, Mujica-Parodi, Harmon-Jones, & Hajcak, 2011; Gehring & Willoughby, 2002; Holroyd & Coles, 2002). The FRN has consistently been shown to index the positive versus negative motivational significance of feedback (Hajcak, Moser, Holroyd, & Simons, 2006), and appears to reflect important individual differences in emotional processing (e.g., see Santesso et al., 2012). Traditionally, the FRN has been thought to gauge decreases in phasic dopamine signals from the basal ganglia that occur during expectation of loss compared to reward (see Bellebaum & Daum, 2008; Hajcak et al., 2006). However, Carlson and colleagues (2011) have recently demonstrated that mesocorticolimbic dopamine structures including the ventral striatum, caudate, amygdala, medial prefrontal cortex, and orbitofrontal cortex were activated during functional magnetic resonance imaging in response to monetary gains compared to losses during completion of a gambling task (Carlson et al., 2011). This activation was paralleled by more positive deflections in FRN amplitude following gains as opposed to losses approximately 250–350 ms post feedback. The
FRN, then, may indicate activity in the ventral striatum, caudate, amygdala, medial prefrontal cortex, and orbitalfrontal cortex in response to rewards compared to non-rewards (see also Foti, Weinberg, Dien, & Hajcak, 2011; but, see Cohen, Cavanaugh, & Slagter, 2011). Carlson and colleagues’ contention appears supported by functional MRI data indicating that the medial prefrontal cortex may be more active in response to gain relative to losses (Fujiwara, Tobler, Taira, Iijima, & Tsutsui, 2009; Rogers et al., 2004) and to pleasant versus unpleasant images (Sabatinelli, Bradley, Lang, Costa, & Versace, 2007).

4.2 Study 3 – Overview

Hypothetically, if conservatives are in fact characterized by more intense positive experience at a given level of emotional intensity, then they should manifest higher amplitude FRN responses to positive stimuli. If, on the other hand, conservatives are uniquely sensitive to negative, but not positive arousing stimuli, then they should not exhibit more positive FRN deflections in response to positive stimuli, and may even show more negative FRN deflections to negative stimuli. The former finding would suggest that conservative political beliefs may be linked to positivity in addition to negativity biases, as suggested by the arousal model put forward by Tritt and colleagues (in press).

Emotional biases among conservatives are thought to stem from various more specific psychological processes associated with conservative ideology (see Jost et al., 2003). We accordingly opted to examine one such psychological process, rather than political attitudes per se. In particular, we assessed system justification (SJ), the motive to defend the prevailing socio-political system, thought to underlie conservative systems of belief (e.g., see Jost & Banaji, 1994; Napier & Jost, 2008). In so doing, we arguably assessed a more direct hypothesis about the psychological foundations of conservative ideology.

Moreover, we chose to employ a non-social task, unrelated to political topics, which enabled us to assess individual differences in generalized reward sensitivity. Furthermore, by using standardized positive and negative stimuli that are equal in arousal (feedback), arousal was not confounded with valence.
4.3 Study 3 – Method

Participants. Complete EEG data was obtained from 41 individuals from an introductory psychology course participating for course credit. Some were excluded from analyses because of excessive ERP artifacts ($N=6$). One additional subject was excluded from analysis. He was deemed an outlier based on a scatter-plot examined between scores on the SJ scale and the difference score of the FRN between positive and negative feedback types. As well, he obtained outlying scores on the SJ scale (> 2 SDs above the mean). Finally, some subjects ($N=5$) did not complete all self-report questionnaires. This left a final sample of 29 participants (22 females; mean age=19.17; $SD=4.79$).

The research protocol was approved by the University of Toronto ethics board. All participants gave their consent before beginning the online survey.

System Justification. Participants completed an 8-item self-report measure of SJ (Kay & Jost, 2003), which includes items such as: “Society is set up so that people usually get what they deserve” and “In general, the Canadian political system operates as it should”. Responses were scored on 9-point scales ranging from 1 “strongly disagree” to 9 “strongly agree.” The sample mean= 4.57 (SD=.98). Reliability was good, $\alpha=.76$. We also coded the SJ scale for extremity rather than orientation – i.e., responses were scored on 5-point scales ranging from 1 “neither agree nor disagree” to 5 “strongly agree” or “strongly disagree”. The sample mean was 2.44 (SD = .42).

Time estimation task. We adopted a paradigm used previously by Oliveira, McDonald, & Goodman, (2007) to elicit the FRN. While completing this task, participants were asked to press a button when a horizontally moving visual stimulus reached the mid-point of a computer screen. Responses were initially considered correct if they fell within 250 ms of the proper time. The time window of a correct response was decreased by a factor of 0.85 after each correct response, and increased by a factor of 1.10 after each incorrect response (although it was never allowed to decrease below 120 ms). This response calibration was performed so that, on average, participants would receive an equal number of veridical positive and negative feedback signals.

Participants were informed that they would be awarded 4 cents for every correct trial, but would forfeit the same amount for an incorrect response. In actuality, however, participants
received $5, regardless of their performance, upon completing the study. The FRN was stimulus-locked to feedback presentation. Participants were instructed to blink as infrequently as possible and to refrain from moving their eyes. All participants completed 200 trials.

Immediately following their response to the visual stimulus, subjects were asked to indicate whether they had responded accurately on a scale ranging from 1 “I am certain that my answer was not on time” to 4 “I am certain that my answer was on time”. These answers were used to judge whether the feedback that they subsequently received was expected or unexpected. Expectation did not moderate the results. Therefore, we did not analyze expectation as an independent variable but retained it as a covariate, controlling for it in all analyses.

_Electrophysiological recording and processing._ EEG was recorded using a stretch Lycra cap (Electro-Cap International, Eaton, Ohio) embedded with 32 tin electrodes, with electrodes arranged in the international 10-20 system. Recordings were digitized at 512 Hz using ASA acquisition software (Advanced Neuro Technology B.V., Enschede, The Netherlands) with a digital average of both ears as the reference. EEG was analyzed with Brain Vision Analyzer 2.0 (Brain Products GmbH, Munich, Germany). EEG was corrected for vertical electro-oculogram artifacts (Gratton, Coles, & Donchin, 1983) and digitally filtered offline between 0.1 and 30 Hz (24dB IIR filter). EEG signals were time-locked to the presentation of feedback. Baseline correction was done using the period between -200 and 0 ms before feedback presentation. Artifacts were detected and rejected using an automatic procedure that employed the following criteria: a voltage step of more than 25 µV between sample points; a voltage difference of 150 µV within 150 ms intervals; voltages above 85 µV and below -85 µV; and a maximum voltage difference of less than 0.50 µV within 100 ms intervals. Such intervals were rejected from individual channels in each trial. For each artifact-free trial, an epoch was defined between - 200 ms before and 1000 ms after feedback. These epochs were grand-averaged (i.e., the mean across all groups) within their respective feedback-stimulus-type conditions.

FRNs were calculated for each feedback type: positive and negative. The FRN was scored at the midline sites Fz, Fcz, and Cz, where this ERP component appears maximally located (e.g., Gehring & Willoughby, 2002; Oliveira et al., 2007; Santesso et al., 2012). Moreover, inspection of topographical maps of the difference scores of EEG activity in response to negative minus positive feedback in the time-window of the FRN revealed that the FRN
seemed most differentiated at these 3 electrode cites (see Figure 3). The FRN was scored as the mean peak between 200–350 ms following feedback onset, as suggested by Santesso and colleagues (2012). Each participant’s average had a minimum of 10 artifact-free feedback trials, a number that has previously been established as appropriate for the FRN (Bellebaum & Daum, 2008). See Figure 3 for waveform graph.

Figures 3 and 4 depict the difference wave of the FRN in response to negative minus positive stimuli. Difference waves minimize the effect of overlap between the FRN and ERP components such as the P3, which may reflect the next peak of the phase-locked theta cycle (see Holroyd & Krigolson 2007; Holroyd, Pakzad-Vaezi, & Krigolson, 2008; Van der Helden, Boksem, & Blom, 2010).

4.4 Study 3 – Results

We assessed the effect of feedback type (positive vs. negative), expectation (expected vs. unexpected), electrode (FZ, vs. FCZ, vs. CZ), and SJ upon FRN amplitudes. Multilevel modeling was used to analyze the data to account for a mixed design with a continuous predictor. The fixed-effects model predicted the FRN from an effect-coded feedback type variable (-1=negative feedback, 1=positive feedback), an effect-coded expectation variable (-1=expected feedback, 1=unexpected feedback), an electrode site variable (1=FZ, 2=FCZ, 3=CZ), and mean-centered SJ, as well as the interactions among these variables. We used a variance components covariance matrix to estimate a random intercept for each participant. We calculated semi-partial $R^2$ effect sizes, which estimate the relative variance explained by each predictor (Edwards, Muller, Wolfinger, Qaqish, & Schabenberger, 2008).

In the omnibus model, we first checked to see if there was a significant interaction between electrode site (FZ, FCZ, CZ) and valence in predicting FRN amplitude. Such an interaction would imply that the FRN is maximally located at a specific electrode and that we should be conducting our analyses at that site. We did not find evidence of such an interaction, $b=-.07$, $SE=.28$, $F(1,302.01)=.07; p=.788, R^2<.01$, which suggests that the FRN was equally evident across all 3 electrodes. Electrode site also did not interact with SJ to predict FRN, $b=.26$, $SE=.29$, $F(1,302.13)=.81; p=.368, R^2=.01$. Nor was there a 3-way interaction between electrode
site, SJ, and valence, $b=.19$, $SE=.29$, $F(1,302.01)=.44$; $p=.509$, $R^2<.01$. A main effect of electrode region was noted, $b=-1.75$, $SE=.28$, $F(1,302.08)=40.31$; $p=.001$, $R^2=.12$.

In replication of previous FRN studies (e.g., Hajcak et al., 2006), a main effect of valence was detected ($b=2.99$, $SE=.23$, $F(1,302.09)=176.29$; $p=.001$, $R^2=.37$) such that the amplitude of the FRN was more positive in response to positive ($M=17.21\mu V$; $SD=7.45\mu V$) than negative ($M=11.37\mu V$; $SD=5.12\mu V$) feedback (see Figure 1 for waveform graph). However, a main effect of expectation upon FRN amplitudes was not found, $b=-.08$, $SE=.23$, $F(1,302.15)=.14$, $p=.714$, $R^2<.01$. Nor were there significant interactions between valence and expectation, $b=.11$, $SE=.23$, $F(1,302.18)=.23$, $p=.632$, $R^2<.01$, or between expectation and SJ, $b=.39$, $SE=.24$, $F(1,302.39)=2.63$, $p=.106$, $R^2=.01$, in predicting the FRN.

With regards to SJ, a main effect upon the FRN was not found, $b=1.49$, $SE=1.15$, $F(1,27.08)=1.69$, $p=.205$, $R^2=.06$. However, a significant interaction between SJ and feedback type in predicting the FRN did emerge, $b=.66$, $SE=.24$, $F(1,302.27)=7.62$; $p=.006$, $R^2=.02$. Follow-up simple effects tests were conducted following the methods of Aiken and West (1991), separately assessing whether the FRN was more differentiated by feedback type among participants high or low in SJ. The FRN was significantly differentiated by feedback type among participants both high ($b=3.62$, $SE=.33$, $F(1,302.04)=122.60$, $p=.001$, $R^2=.29$) and low ($b=2.36$, $SE=.32$, $F(1,302.33)=55.79$, $p=.001$, $R^2=.18$) in SJ.

We then analyzed whether SJ was related to the FRN specifically in response to positive or negative feedback types. SJ did not appear specifically related to negative feedback ($b=.84$, $SE=1.17$, $F(1,29.29)=.51$, $p=.480$, $R^2=.01$), but was associated (a trend) with enhanced FRN in response to positive feedback ($b=2.15$, $SE=1.17$, $F(1,29.59)=3.36$, $p=.077$, $R^2=.09$). It seems therefore that system justifiers displayed more positive FRNs in response to positive feedback. See Figure 4 for waveform graphs and see Figure 4 for scatterplots. This pattern is consistent with the hypothesis that conservatives exhibit increased emotional responsivity to positive stimuli.

All analyses were duplicated without including expectation in the models. This did not alter the significance of any finding.

*Extremism versus orientation: An exploratory analysis*
We re-ran our analysis including an extremism coded SJ variable instead of the regularly coded SJ variable. No main effect of extremism was found upon FRN amplitudes ($b=1.87$, $SE=2.87$, $F(1,27.08)=.43$, $p=.520$, $R^2<.01$), nor was there an interaction between extremism and valence in predicting FRN amplitudes, $b=.46$, $SE=.61$, $F(1,302.27)=.56; p=.456$, $R^2<.01$. Study 3 therefore does not support the extremism hypothesis (Greenberg & Jonas, 2002).

4.5 Study 3 – Discussion

Firstly, the results replicated numerous previous studies of the FRN in response to negative compared to positive feedback (e.g., Carlson et al., 2011; Hajcak et al., 2006) and generally demonstrate the usefulness of the FRN as a measure of individual differences. Second, the results indicated that individuals who expressed more support for the current socio-political system exhibited greater sensitivity to positive feedback, indexed by an ERP component thought to reflect neural activity in reward-processing brain regions (see Carlson et al., 2011). This study supports the notion, then, that SJ, a fundamental component of conservative ideology, is associated with a ‘positivity bias,’ such that rewarding stimuli are experienced with heightened intensity.

The fact that system justifiers manifest heightened reactivity in reward-processing neural regions (see Carlson et al., 2011) suggests, once again, that current theories that emphasize the relationship between conservative ideology and aversive states such as uncertainty, threat, and disgust (e.g., see Hibbing et al., in press; Jost et al., 2003 for reviews) may not be comprehensive enough. Our study finding is consistent, on the other hand, with several studies that have found that conservatives are happier than liberals (e.g., Napier & Jost, 2008; Schlenker et al., 2012; Taylor et al., 2006). Indeed, Study 3 may suggest a neural mechanism through which conservatives experience more positive psychological states such as happiness; system justifiers may process positive information with heightened intensity.

We did not find any relationship between SJ and the FRN in response to negative stimuli. This seems surprising, given that past research has found that conservatives exhibit enhanced physiological responses to aversive stimuli (see Hibbing et al., in press for review). Perhaps this may be due to the fact that the FRN may more accurately reflect reward rather than threat-processing neural activity (Carlson et al., 2011). The FRN, consequently, may be relatively more
able to detect individual differences in reward as opposed to threat sensitivity. Thus, it is likely not reasonable to construe this study as a test for the presence of a negativity bias among conservatives. It is better understood as providing partial support for the idea that conservatives might respond more to arousing, positively-valenced stimuli than liberals.

The relationship between a fundamental aspect of conservative ideology and reward processing, as indicated by this study, does not support a negative valence model of political conservatism, as has recently been suggested by Hibbing and colleagues (in press). Instead, it suggests that conservatism may be driven by arousal. Study 4 further examines whether conservatives exhibit attentional bias to positive and negative stimuli. Study 4 employs a larger sample size, more general emotional stimuli and a more general political orientation measure, assessed with a different ERP component, thought to detect negatively- as well as positively-valenced attentional biases.
Chapter 5
Study 4

5 Study 4

5.1 Study 4 – Introduction

Study 4 further tested the notion that conservatism is associated with physiological sensitivity to positive as well as negative stimuli. A variety of measures of conservative political attitudes were used to determine if Study 3’s results would generalize to a more general measure of conservative ideology than system justification. Study 4 also assessed more general attentional bias to a variety of emotional stimuli, instead of feedback on a time estimation task (which is a more specific type of attentional bias). Finally, we evaluated a different component of the ERP, the Late Positive Potential (LPP), which may be conceived as an index of the motivational salience of an emotional stimulus for a particular individual (e.g., Ito, Larsen, Smith, & Cacioppo, 1998).

The LPP is a sustained positive deflection in the ERP that becomes evident approximately 400 ms following stimulus onset at the midline of the scalp, and which may extend for several seconds following stimulus presentation (Holmes, Kragh Nielsen, & Green, 2008). The LPP apparently indexes sustained attention (e.g., Hajcak & Olvet, 2008). Its amplitude appears modulated by the emotional intensity of a stimulus, increasing in proportion to emotional significance (e.g., Hajcak & Olvet, 2008; Moser, Hajcak, Bukay, & Simons, 2006). Pleasant and unpleasant stimuli, for example, elicit a larger LPP than neutral stimuli (e.g., Hajcak & Olvet, 2008), and the LPP increases in relation to subjective ratings of emotional intensity (e.g., Hajcak & Olvet, 2008). The LPP is correlated with neural activity in the lateral occipital, inferotemporal, and parietal visual areas (Sabatinelli et al., 2007) and relates to subsequent recall of pictures (Dolcos & Cabeza, 2002). The enhanced LPP is accordingly thought index inhibition of potentially competing representations in the visual cortex, which allows for more selective processing of motivationally salient stimuli (Brown, Steenbergen, Band, de Rover, & Nieuwenhuis, 2012).
The LPP may therefore be conceived as an index of the motivational salience of an emotional stimulus for a particular individual (e.g., Ito et al., 1998). Because of its relatively late time course, the LPP also reflects processes involved in meaning making, attention allocation, and memory, rather than immediate visual processing of stimuli. Accordingly, researchers have begun to examine the LPP as a marker of emotional processing in specific populations. For example, children who have suffered abuse exhibit larger LPP amplitudes to angry but not fearful faces (Pollack, Klorman, Thatcher, & Cicchetti, 2001). This may reflect the heightened motivational relevance to this population of angry faces, which may have preceded abuse. By contrast, adults who are high in mindfulness, a trait characterized by present-moment awareness (Brown & Ryan, 2003), exhibit smaller LPP amplitudes to highly arousing images, which may reflect their enhanced ability to engage adaptive emotion regulation strategies (Brown, Goodman, & Inzlicht, 2013; Teper, Segal, & Inzlicht, 2013).

Since the LPP has previously been found to index individual differences in processing of emotionally salient information, it seemed reasonable to use it to gauge attentional bias to negatively and positively-valenced stimuli differing in arousal to individuals with more conservative versus liberal political beliefs.

5.2 Study 4 – Overview

We examined the relationship between individual differences in political orientation and the LPP in response to photographs that were either positive or negative and were either arousing or non-arousing. Two alternative hypotheses were considered: 1) if the negative valence model of political orientation is correct, then political orientation should be significantly associated with LPP amplitudes specifically in response to negatively-valenced stimuli; and 2) if a more general arousal model is correct, then political orientation should predict the LPP in response to arousing versus non-arousing stimuli.

5.3 Study 4 – Methods

Participants. 43 individuals (26 males; mean age=18.83; SD=2.36) from an introductory psychology course participated in exchange for course credit. One participant did not complete all self-report questionnaires. We replaced this missing data with the series mean.
The research protocol was approved by the University of Toronto ethics board. All participants gave their consent before beginning the online survey.

**Political orientation.** We administered the 12-item social conservatism scale (SCS), was originally devised by Wilson and Patterson (1968) and updated by Henningham (1995). Each item consists of a single word or short phrase, such as “abortion,” “gay rights,” and “multiculturalism.” For the purposes of our study, respondents were asked to indicate on a 7-point Likert type scale the extent to which they are “for” (7) or “against” (1) each of the items. Liberal items (e.g., multiculturalism) were inversely coded such that higher scores reflected more conservative political beliefs. The sample mean was 4.27 ($SD = .82$) and the scale was found to be reliable in our sample (Chronbach’s $\alpha = .75$). The SCS was also coded for extreme scores regardless of their orientation such that moderate scores were coded with lower scores and more extreme responses were coded with higher numbers (i.e., moderate scores “4” were coded as “1” and extreme scores of “1” and “7” were coded as “4”). The sample mean was 2.35 (SD = .48).

**Photograph stimuli.** We selected 150 pictures from the International Affective Picture System (IAPS)\(^5\). The IAPS is a set of images that have been given standardized ratings based on arousal and valence (Lang, Bradley, & Cuthbert, 1997). Thirty pictures were selected for each valence/a arousal category (high arousal pleasant, low arousal pleasant, high arousal unpleasant, low arousal unpleasant). In addition, 30 neutral pictures, which were low in arousal and unvalenced, were additionally selected as a manipulation check however these were not included in our main analyses. They were included in the picture-viewing paradigm only to ensure that we would replicate the previously established finding that the LPP is enhanced in response to motivationally salient compared to neutral stimuli.

The high-arousal pleasant pictures consisted of content including erotic and adventure scenes. Low-arousing pleasant pictures included content such as flowers, smiling people, and children. High-arousal unpleasant pictures included images of mutilation/disfigurement, disease, and attack scenes. Low-arousal unpleasant pictures included images of sad faces, a jail, garbage, and ashes. Neutral images included pictures of objects such as utensils, furniture, and neutral faces.
The standardized mean arousal and valence ratings of our experimental stimuli are listed in Table 4. High-arousing photographs were significantly more arousing than low-arousing photographs, and positively-valenced stimuli were significantly more pleasant in valence than negative stimuli ($t(118) = 15.09; p = .001$ and $t(118) = 21.98; p = .001$, for arousal and valence respectively).

At the end of the experiment, participants were asked to rate a subset of 5 images from each category (i.e., high-arousal pleasant, high-arousal unpleasant, low-arousal pleasant, low-arousal unpleasant). They were asked to evaluate each image on a scale ranging from 1 “unpleasant” to 10 “pleasant” and on a scale ranging from 1 “calming” to 10 “moving”. The word arousal was not used to avoid confusion with the lay-term “arousal”, which may refer to sexual arousal. The means and SDs of these ratings are presented in Table 4, along with their correlations with the social conservatism scale. These correlations were conducted to explore whether political orientation was associated with self-reported ratings of each type of photograph.

The picture-viewing task. Participants were instructed to view a series of images, each presented for 2022-2545 ms, following a fixation cross presented for 500 ms. Images were presented once each in random order (comprising a total of 150 trials). After the 30th, 60th, 90th, and 120th trials, participants were prompted to relax, and take a break, and to press a key when ready to continue.

This passive picture-viewing paradigm was completed twice. In-between the first and second administration of the picture-viewing paradigm, participants completed a failed experimental manipulation. This manipulation was an exploratory addition to the study and was not the main purpose of our investigation.

Electrophysiological recording and processing. EEG was recorded using a stretch Lycra cap (Electro-Cap International, Eaton, Ohio) embedded with 32 tin electrodes, with electrodes arranged in the international 10-20 system. Recordings were digitized at 512 Hz using ASA acquisition software (Advanced Neuro Technology B.V., Enschede, The Netherlands) with a digital average of both ears as the reference. EEG was analyzed with Brain Vision Analyzer 2.0 (Brain Products GmbH, Munich, Germany). EEG was corrected for vertical electro-oculogram artifacts (Gratton et al., 1983) and digitally filtered offline between 0.1 and 30 Hz (24dB IIR
EEG signals were time-locked to stimulus presentation. Baseline correction was done using the period between -200 and 0 ms before stimulus presentation. Artifacts were detected and rejected using an automatic procedure that employed the following criteria: a voltage step of more than 25 µV between sample points; a voltage difference of 150 µV within 150 ms intervals; voltages above 85 µV and below -85 µV; and a maximum voltage difference of less than 0.50 µV within 100 ms intervals. Such intervals were rejected from individual channels in each trial. For each artifact-free trial, an epoch was defined between -200 ms before and 1000 ms after stimulus presentation. These epochs were grand-averaged within their respective stimulus type conditions.

LPPs were calculated for each stimulus type: high-arousal positive, high-arousal negative, low-arousal positive, low-arousal negative, and neutral. The LPP was scored at the midline cite Pz, where this ERP component is maximally located (e.g., Moser, Hajcak, Bukay, & Simons, 2006). Inspection of topographical headmaps additionally confirmed that ERP responses to arousing versus neutral stimuli were most differentiated in the time window of the LPP at centro-parietal electrodes (See Figure 6). The LPP was scored as the area between 400–700 ms following stimulus onset, as done by Holmes and colleagues (2008). Each participant’s average had a minimum of 13 artifact-free trials, a number that exceeds the minimum for maintaining reliability of similar ERP components (Cohen & Polich, 1997; see Figure 6 for waveform graph).

5.4 Study 4 – Results

In a first analysis, LPP amplitudes were modeled as a function of stimuli valence (within-subjects: -1=negative, 1=positive), arousal (within-subjects: -1=low, 1=high), whether the data was collected pre- or post-experimental manipulation (within-subjects: -1=pre manipulation, 1=post manipulation), political orientation (between-subjects: continuous), and the interactions among these variables. We used multilevel modeling to analyze our data to account for a mixed design with a continuous predictor. We used a variance components covariance matrix to estimate a random intercept for each participant. As an estimate of effect size, we calculated semi-partial $R^2$ for each model parameter, which estimates the relative variance explained by each predictor (Edwards et al., 2008). Because it is possible that conservatives may have a more negative or ambivalent response to erotic stimuli, all of our analyses were re-run with the erotic stimuli dropped and these results are reported in addition to our main analyses.
The Effect of Valence and Arousal Upon LPP Amplitudes

With regard to the effect of emotional stimuli upon LPP amplitudes, there was a main effect of arousal upon LPP amplitudes \( (b=863.16, SE=81.67, F(1,234.85)=111.70, p=.001, R^2=.32) \) whereby the amplitude of the LPP was more positive in response to arousing compared to less arousing stimuli. A trend of a main effect of valence upon LPP amplitudes was also found \( (b=154.19, SE=81.81, F(1,234.96)=3.55, p=.061, R^2=.01) \) in which the amplitude of the LPP seemed more positive in response to pleasant compared to aversive stimuli (see Figure 6 for waveform graph and Table 5 for means). The finding that the LPP was moderated by arousal more so than valence replicates past ERP work (e.g., see Weinberg & Hajcak, 2010).

These main effects were qualified by an interaction between valence and arousal in predicting LPP amplitudes, \( b=224.79, SE=81.67, F(1,234.85)=7.58, p=.006, R^2=.03 \). Follow-up simple effects tests were conducted following the methods of Aiken and West (1991), separately assessing the impact of intensity upon positively and negatively valenced stimuli and the impact of valence upon stimuli that are high or low in arousal by dummy-coding these variables with the reference group as the target group. Arousal was positively related to the LPP irrespective of whether stimuli were positively \( (b=1087.95, SE=114.14, F(1,234.85)=90.86, p=.001, R^2=.28) \) or negatively \( (b=638.37, SE=116.85, F(1,234.86)=29.85, p=.001, R^2=.11) \) valenced. However, valence had a significant impact upon the LPP when stimuli were highly arousing \( (b=378.98, SE=115.51, F(1,234.94)=10.76, p=.001, R^2=.04) \) but not when stimuli were less arousing, \( b=-70.60, SE=115.68, F(1,234.88)=.37, p=.542, R^2<.01 \). This result suggests that the participants in our study reacted to highly arousing, positive stimuli (i.e., mostly erotic stimuli) with heightened arousal compared to highly arousing, negative stimuli. See Figure 6 and Table 5.

When our analysis was re-run with erotic content removed, a main effect of arousal upon LPP amplitudes was noted \( (b=609.03, SE=87.24, F(1,234.91)=48.73, p=.001, R^2=.32) \) whereby the amplitude of the LPP was more positive in response to arousing compared to non-arousing stimuli. However, there was no longer any trend of a main effect of valence upon LPP amplitudes, \( (b=-107.49, SE=87.39, F(1,235.03)=1.51, p=.220, R^2<.01) \), nor was there an interaction between valence and arousal in predicting LPP amplitudes, \( b=-32.81, SE=87.24, F(1,234.91)=.14, p=.707, R^2<.01 \).
A main effect was found whereby conservatives exhibited greater LPP amplitudes overall, $b=826.22$, $SE=409.51$, $F(1,40.03)=4.07$, $p=.050$, $R^2=.06$. A significant interaction was moreover found between conservatism and arousal in predicting LPP amplitudes, $b=-238.82$, $SE=101.84$, $F(1,234.89)=5.50$, $p=.020$, $R^2=.03$. Follow-up simple effects tests revealed that there was a simple effect of conservatism upon stimuli that were low in arousal, $b=1065.04$, $SE=422.03$, $F(1,45.12)=6.37$, $p=.015$, $R^2=.06$, but no effect of conservatism among stimuli that were high in arousal ($b=587.40$, $SE=421.94$, $F(1,45.08)=1.94$, $p=.171$, $R^2=.02$). This means that conservatives exhibited enhanced LPP compared to liberals specifically in response to stimuli with lower standardized arousal ratings (Figure 7). Follow-up simple effects tests revealed that arousal was significantly related to amplified LPP among participants both high ($b=666.99$, $SE=113.33$, $F(1,234.87)=34.64$, $p=.001$, $R^2=.12$) and low ($b=1059.33$, $SE=120.38$, $F(1,234.88)=77.43$, $p=.001$, $R^2=.24$) in conservatism. These findings suggest that conservatives, compared to liberals, may be more easily aroused by stimuli in general and these effects may be especially pronounced for low arousal stimuli (presumably because both conservatives and liberals alike exhibited heightened LPP in response to extremely arousing stimuli).

A significant interaction between conservatism and valence was not found in predicting LPP amplitudes, $b=3.37$, $SE=102.04$, $F(1,235.02)=.00$, $p=.974$, $R^2<.01$, which does not support the negative valence model of political conservatism put forward by Hibbing et al. (in press; see also Jost et al., 2003). See Figure 7. Nor was a 3-way interaction found between conservatism, intensity, and valence, $b=-149.11$, $SE=101.84$, $F(1,234.89)=2.14$, $p=.144$, $R^2=.01$. Taken together, this pattern of results suggests that conservatives may have a lower threshold of arousal than liberals, responding more intensely to stimuli not typically considered to be particularly affectively salient. This effect is not dependent upon the valence of our emotional stimuli.

Omitting erotic content stimuli did not alter the significance of any of our findings with regards to conservatism. A main effect of greater LPP amplitudes among conservatives was still noted, $b=815.07$, $SE=407.95$, $F(1,40.10)=3.99$, $p=.053$, $R^2=.05$, as was a significant interaction between conservatism and intensity in predicting LPP amplitudes, $b=-228.76$, $SE=108.79$, $F(1,234.95)=4.42$, $p=.037$, $R^2=.03$, which was in the same direction as was found when erotic stimuli were included in the analysis. A significant interaction between conservatism and valence
was not found in predicting LPP amplitudes, $b=1.35$, $SE=109.01$, $F(1,235.10)=.00$, $p=.990$, $R^2<.01$, nor was there a 3-way interaction found between conservativism, intensity, and valence, $b=-141.14$, $SE=108.79$, $F(1,234.95)=1.68$, $p=.196$, $R^2<.01$.

Taken together, this pattern of results suggests that conservatives are sensitive to the arousal rather than the valence of stimuli. And, more specifically, conservatives may have a lower threshold of arousal than liberals, responding more intensely to stimuli not typically considered to be particularly affectively salient.

*Extremism versus orientation: An exploratory analysis*

We re-ran our analysis including the extremism coded SCS instead of the normally coded SCS. A main effect of extremism upon LPP amplitudes was not found ($b=413.66$, $SE=722.08$, $F(1,40.03)=.33$, $p=.570$, $R^2<.01$), nor were there significant interactions between extremism and valence ($b=26.91$, $SE=165.65$, $F(1,235.02)=.03$, $p=.871$, $R^2<.01$), between extremism and arousal, $b=-40.64$, $SE=150.90$, $F(1,234.89)=.07$, $p=.788$, $R^2<.01$, or among extremism, arousal, and valence, $b=-38.55$, $SE=165.62$, $F(1,234.89)=.05$, $p=.816$, $R^2<.01$. Study 4 therefore does not support the extremism hypothesis (Greenberg & Jonas, 2002).

*Reactivity to All Stimuli Among Conservatives?*

In our previous analyses, we examined effects of stimuli that that were defined as positive or negative, which were either high or low in arousal. Yet, it is possible that conservatives are more reactive to any stimulation. If so, it is possible that our effects will be observed to even the neutral stimuli. Consistent with this idea, we found a correlation between political ideology and the LPP to neutral stimuli, $r=.357$, $p=.020$ such that conservatives had larger LPPs even to these relatively valence free stimuli. Comparing the size of this effect to the other stimuli (see Table 5), this effect mirrors the effect for the low arousal images. Thus, whereas liberals tended to have large LPPs to only the high arousing positive and negative stimuli, conservatives exhibited equally high responses to the extreme stimuli and also had enhanced responses to low arousing and neutral stimuli. In sum, conservatives, by being more sensitive and reactive to all stimuli, show less differentiation or sensitivity to the different stimulus classes.
Self-Reported Valence and Arousal Ratings Among Conservatives?

Participants were asked to rate a subset of images from each category based on valence and arousal dimensions. Correlations were conducted to explore whether political orientation was associated with self-reported ratings of each type of photograph. The means and SDs of these ratings are presented in Table 5. As can be seen in Table 5, conservatism was associated with rating erotic images as relatively less pleasant. Presumably, this might be due to the fact that social conservatism stresses regulation of enjoyment of erotic content. Political orientation was not correlated with self-report ratings of the valence or the arousal of any other stimulus types. This may suggest that arousal and valence biases among conservatives are not as easily detected by self-report as by psychophysiological methods.

5.5 Study 4 – Discussion

We examined the LPP, an ERP component indexing individual sustained attention elicited by an emotional stimulus (e.g., Ito, Cacioppo, & Lang, 1998), in response to arousing and non-arousing, positively and negatively-valenced stimuli. We assessed such LPP amplitude responses in relation to political orientation with the ultimate goal of testing two alternative hypotheses: 1) that conservatives are sensitive to negative valence, per se (Hibbing et al., in press; see also Jost et al., 2003); and 2) that conservatives are sensitive to arousing stimuli. A significant interaction between political orientation and arousal emerged. Valence, however, did not interact with political belief to predict LPP amplitudes. This pattern of results suggests, once again, that arousal, rather than negative valence, fundamentally underlies the emotional processing biases among conservatives.

The interaction between arousal and political orientation occurred because conservatives exhibited larger LPP amplitudes than liberals in response to stimuli with low (standardized) arousal ratings. This appears to mean that conservatives have a lower threshold of arousal, reacting more intensely than liberals to stimuli not typically considered particularly salient. Thus, it appears that conservatives experience relatively innocuous stimuli more intensely than liberals.

In sum, Studies 3 and 4 suggests that attentional biases among conservatives are not specific to negative valence. Moreover, Study 4 suggested that conservatives exhibit heightened
electrophysiological sensitivity to *all* emotional stimuli, even those not typically considered particularly salient. This is consistent with the notion that individuals who tend to experience more arousal in response to the emotional stimuli that they encounter on a daily basis may be inclined to develop more conservative political orientation.
Chapter 6
General Discussion

6 General Discussion

6.1 Summary of Findings

Standard psychological models of political belief are predicated on the idea that negatively-valenced states such as anxiety and disgust motivate conservative shifts in beliefs, and that conservatives are sensitive to threat and disgust, per se. However, studies 1-4 provide evidence that positively-valenced emotional arousal – just like threat and disgust -- enhance endorsement of right-wing political speeches (Studies 1 and 2) and that conservatives experience heightened psychophysiological sensitivity to pleasant, as well as unpleasant, emotional stimuli (Studies 3 and 4). Taken together, these studies provide preliminary support for an arousal model of political orientation (Tritt et al., in press; Tritt et al., under review), which may account for some of the underlying contributors to conservatism more accurately than the existing negative valence model (e.g., see Hibbing et al., in press; Jost et al., 2003).

6.2 Emotional Arousal Leads to More Conservative Political Orientation

The finding that positive stimuli led to conservative shifts in political belief cannot be easily accounted for within the framework of current psychological theories of political ideology, which suggest that it is avoidance-motivated states, specifically, that lead people to endorse more conservative beliefs (e.g., McGregor et al., 2005; McGregor et al., 2001; Nail et al., 2009; also see Hibbing et al., in press; Jost et al., 2003). Past researchers, suggesting that uncertainty and threat manipulations prompt conservative shifts in beliefs, compared only with neutral control groups (e.g., Bonanno & Jost, 2006; McGregor et al., 2005; McGregor et al., 2001; Nail et al., 2009), may have inadvertently drawn a too-specific conclusion: that such shifts were caused by uncertainty or threat rather than arousal, more generally.

If emotional arousal enhances the attractiveness of conservative ideology then individuals
who tend to experience more emotional arousal in response to environmental stimuli might, over
time, be inclined to endorse more conservative ideologies and, perhaps, to act in a more
conservative manner. This notion is not only consistent with these four studies, but also with a
recent neurobiological study that found that right amygdala volume is greater among
conservatives (Kanai et al., 2011). Since the amygdala has been implicated in detecting a broad
range of motivationally relevant stimuli, including positive rewards (e.g., Cunningham &
Brosch, 2012), its greater volume could reflect a low threshold of emotional arousal.

The notion that conservatives, compared to liberals, have a lower threshold of
stimulation, taken in conjunction with findings that conservatives are avoidant of emotional
arousal (Leone & Chirumbolo, 2008), may explain some of their preferences. Conservatives
prefer familiar and simple over abrasive and complex music and art (e.g., Carney et al., 2008),
for example, and tend to move to rural areas, which may be more tranquil and less emotionally
arousing than cities (Motyl, Iyer, Oishi, Trawalter, & Nosek, 2014). More generally, the
personality profile of conservatives seems to entail relatively high levels of orderliness paired
with relatively low levels of openness (e.g., Hirsh et al., 2010). These personality traits and
preferences might stem from an emotionally sensitive nature, and perhaps as well, a discomfort
with arousal. More broadly, the combination of being easily aroused by stimuli—and intolerant
of such arousal—may explain why conservative ideology often places relatively broad
limitations upon experiences that may prove emotionally or motivationally arousing. For
example, premarital and unconventional sex, sexually explicit literature and representation, and
recreational drug use, all highly arousing experiences, are generally deemed off-limits by
conservatives (Dombrink, 2006). Indeed, extreme right-wing political groups such as the Taliban
may even go so far as to prohibit what they may perceive to be arousing activities such as
dancing, music, kite-flying, and clapping at sports matches (Country Reports on Human Rights
Practices, 2002).

6.3 Future Directions– Why Would Emotional Arousal Cause Conservative Shifts?

Arousal is an important determinant of individual cognitive processing styles. In
particular, high levels of arousal may interfere with reflective and flexible cognitive functioning,
which may lead individuals to engage in a variety of low-effort, gut-level cognitions (see Strack
& Deutsch, 2004 for review). Emotional arousal, whether positive or negative in valence, promotes cognitive rigidity (Braem et al., 2011; Demanet et al., 2011), use of heuristics (e.g., Bodenhausen, 1993; Paulhus & Lim, 1994; see Strack & Deutsch, 2004), engage in dominant response tendencies (Hull, 1943; Zajonc, 1965; see Strack & Deutsch, 2004), and more generally, low-effort thinking (De Houwer & Tibboel, 2010; Schimmack, 2005; Verbruggen & De Houwer, 2007; see also Buodo et al., 2002). Each of these cognitive processes has been linked to conservative ideology. For instance, one of the most replicable findings in the field of political psychology is that conservatives exhibit more cognitive rigidity than liberals (Kemmelmeier, 2007; Sidanius, 1978, 1985; see Jost et al., 2003 for review). Endorsement of the status quo is a fundamental characteristic of conservative ideology (Jost & Banaji, 1994; Wilson, 1973; see also Jost et al., 2003). Moreover, the use of social stereotypes has been associated with conservative ideology (Jost & Banaji, 1994). Finally, experimental disruption of effortful thought processing has been found to prompt conservative versus liberal shifts in political orientation, which suggests that it may be a cause of conservative thought (Eidelman et al., 2012). Given that arousal, regardless of valence, is associated with several cognitive correlates of conservative thought, individuals who regularly tend to experience emotional arousal in response to the emotional stimuli that they encounter might be inclined to endorse more conservative political orientation. Future studies should investigate this potential mechanism.

An additional mechanism through which emotional arousal might enhance support for conservative ideology is that arousal may lead individuals to feel out of control, which might enhance the appeal of conservative political orientation in an attempt to regulate the social environment so as to diminish the potential for further arousal. Conservatives tend to advocate for stricter control of immigration and alternative lifestyles, for example, minimizing exposure to novel and differing value systems, and more generally, by supporting the socio-economic status quo. By offering a common set of externally prescribed and fixed values, political conservatism may offer the individual a means of regulating the social environment to limit exposure to emotionally and motivationally arousing situations. In this context, individuals in an emotionally aroused state might be particularly drawn to this ideology. Although primitive arousal systems are evolutionarily beneficial, driving organisms to eat, drink, procreate, and to avoid danger, intense arousal is frequently experienced as aversive (Eysenck, 1987; Geen, 1984). Arousal may
interfere with controlled thought processes and prompt individuals to action motivated by short-term impulse, rather than under the guidance of reason, agreed upon rules, and duties – making it unacceptable to conservatives. Even moderate levels of positive emotion, for example, subjectively desirable as they might be, can result in increases in future discounting, with a disregard for medium to long term security (Hirsh, Guindon, Morisano, & Peterson, 2010), while extreme levels are clearly associated with impulsivity and mania (Carver & Johnson, 2009). Furthermore, and somewhat counter-intuitively, positive emotion can also interfere with the maintenance of social order, as attested to by the frequency and severity of celebratory riots (McPhail, 1983). Emotionally aroused individuals might be inclined then to select situations and political parties that minimize potential for further arousal.

In sum, future research is needed to better understand the mechanisms through which emotional arousal may promote conservatism. Such future investigations should focus upon basic cognitive mechanisms induced by arousal, as well as higher order psychological needs to feel in control, which might be enhanced as well by emotional arousal.

6.4 Future Directions: A Better Understanding of The Relationships Among Personality Traits, Emotional Arousal, and Political Orientation

If sensitivity to emotional stimuli predicts conservative as opposed to liberal orientation, then presumably, conservatives should report trait-level differences in constructs related to emotional intensity. An extensive array of studies has assessed the relationship between political orientation and various individual difference variables related to emotional dispositions (see Jost et al., 2003; Onraet, Van Hiel, & Dhont, 2013 for meta analyses). The current literature, however, is difficult to interpret in light of the arousal hypothesis. Many of the dispositional variables that have been studied in relation to political orientation cannot be clearly classified as high or low in arousal. For instance, although several studies have found that conservatives are happier than liberals (e.g., Napier & Jost, 2008; Taylor et al., 2006), it is unclear whether “happiness” was considered by participants to be a high-arousal state such as excitement, or alternatively, as a low arousal state such as tranquility. Future research is needed to assess the
relationship between political orientation and emotion-related trait variables that clearly differ in terms of arousal and valence.

Some research has assessed the relationship between political orientation and emotional states that are high or low in arousal. Consistent with an arousal theory, studies have indicated that liberals, compared to conservatives, express more sadness-related behaviors such as crying, emotional pain, and low life satisfaction than conservatives (Vigil, 2010). This may indicate a propensity for sadness, which is a low-arousal emotion. Other research suggests that liberals may be calmer than conservatives (Lee, Sohn, & Fowler, 2013). Also consistent with an arousal theory, conservatives, compared to liberals, have been found to report experiencing more disgust, which is a viscerally engaging, high-arousal emotion state (e.g., Hodson & Costello, 2007; Inbar et al., 2009a, 2009b). These findings seem consistent with the notion that individuals who tend to experience high-arousal emotions report more conservative political beliefs, whereas those who tend to experience low-arousal emotions endorse more liberalism.

Inconsistent with an arousal hypothesis (and also inconsistent with a negative valence hypothesis), however, several studies have demonstrated that neuroticism – a personality trait that subsumes high-arousal negative emotions such as fear and anxiety (e.g., Hirsh & Inzlicht, 2008; Jardine et al., 2005) – is not linked to political orientation in any particular direction (e.g., Alford & Hibbing, 2007; Butler, 2000; Carney et al., 2008; Hirsh et al., 2010; see Onraet et al., 2013 for meta analysis). If individuals who are generally sensitive to emotional stimuli are prone to endorse conservatism, then why would they not consistently report more neuroticism?

One possibility is that conservatives who are prone to experience high-arousal emotions select non-stressful environments, such that they do not consistently report high trait-levels of intense negative affect. Although the Big Five trait neuroticism does not predict conservative attitudes, the same cannot be said about conscientiousness, which has been consistently associated with conservatism (e.g., Carney et al., 2008; Hirsh et al., 2010). Conscientious individuals appear to engage in situation selection and situation modification—that is, actively choosing and regulating their environment so that it will facilitate the attainment of their goals (John & Gross, 2007). Because conservatives are conscientious, they may select situations that allow them to avoid experiencing high-arousal negative affect. Longitudinal research is therefore needed to investigate the possibility that conservatives experience emotional stimuli intensely,
and accordingly, develop more conscientiousness, which is turn, may lead them to avoid emotionally arousing situations and experiences of anxiety. This seems like a particularly promising possibility because although conscientiousness and neuroticism are inversely correlated at the between-groups level of analysis (Mount, Barrick, Scullen, & Rounds, 2005), they may be dynamically related within individuals. Neuroticism has been found to lead individuals to become more conscientiousness (Beckmann, Wood, & Minbashian, 2010; see also Fayard, Roberts, Robins, & Watson, 2012). Longitudinal studies have found that children who displayed behavioral traits related to inhibition and anxiety, reported more conservative political beliefs as adults (Block & Block, 2006; Fraley, Griffin, Belsky, & Roisman, 2012). Conceivably, neuroticism in childhood may lead to the development of conscientiousness, which is associated with situation selection that allows individuals to avoid experiencing high-levels of negative affect in adulthood. Indeed, as previously discussed, individuals may adopt a conservative lifestyle and accept conservative beliefs in an attempt to avoid arousing environments. Longitudinal studies will be useful in examining the possibility of a dynamic relationship between neuroticism, conscientiousness, and the development of conservative ideology.

6.5 Future Directions: Specific Neuro-hormonal Arousal Systems

Another important area of future inquiry is the examination of the specific neural and hormonal systems that give rise to the cognitive processing styles that enhance the appeal of conservative ideology. Given the role of arousal in producing conservative versus liberal ideology, norepinephrine seems a likely neuro-hormonal system to investigate as a potential causal mediator.

Dopamine might be another likely candidate for future investigation in terms of its role in producing conservative-related cognitions such as disgust sensitivity and religious belief. Appetitive and fearful affect (i.e., high-arousal positive and negative affect) is associated with dopamine release, whereas anhedonia (flat affect) has been linked to reduced dopamine levels (see Ashby, Isen, Turken, 1999; Faure, Reynolds, Richard, & Berridge, 2008; Berridge, Robinson, & Aldridge, 2009 for reviews). This release of dopamine may enhance olfactory sensitivity. There are reciprocal connections between the ventral tegmental area – the origin of the dopaminergic cell bodies of the mesocorticolimbic dopamine system – and the primary olfactory areas (Oades & Halliday, 1987). These projections have important behavioral...
implications. For example, patients with Parkinson's disease (a disease in which dopamine production is diminished) have impaired olfactory abilities (Zucco, Zaglis, & Wambgsanss, 1991; see Ashby, Isen, & Turken, 1999), and diminished skin conductance and amygdala activation to unpleasant olfactory stimuli (Kawamura & Kobayakawa, 2009). This is important because disgust sensitivity, which is integrally linked to olfactory sensitivity, is thought to be a critical correlate of conservative ideology (e.g., Hodson & Costello, 2007; Inbar et al., 2009a; Inbar et al., 2009b). Enhanced dopamine, which results from high-arousal affect, might lead to sensitivity to smells, and consequently, more disgust sensitivity, which in turn, may promote conservatism.

Interestingly, enhanced dopaminergic activity has been linked to religious belief (Andreason, 2001), which is another fundamental correlate of conservative political orientation (e.g., see Smidt & Penning, 1982). In the clinical literature, patient populations with hyperactive dopamine function exhibit hyper-religiosity. Schizophrenics (especially paranoid types), for instance, report more religious beliefs and experiences than controls (Brewerton, 1994). Mania, which is also characterized by dopamine hyperactivity, are more likely than controls to believe in religious tenets (Brewerton, 1994). Finally, patients with Parkinson’s (low dopamine activity), tend to have reduced tendency to access religious constructs and experiences (e.g., Butler, McNamara, & Durso, 2010). In this context, future studies should investigate the hypothesis that enhanced dopaminergic activation, which may result from intense motivational affect, enhances religiosity, and by accord, conservative political orientation.

Identifying the specific neural and hormonal systems that give rise to cognitive styles associated with conservatism may eventually lead to a more refined understanding of the precise affective underpinnings of political orientation. Although we have suggested that emotional arousal, regardless of valence, enhances conservatism, there may be some basic emotions that are most likely to produce right-wing ideology. Panksepp (1998) outlines seven different emotional systems, each stemming from distinct neurobiological underpinnings. Circumplex models of emotion, which consider only arousal and valence, may not account for these differences. My dissertation research uses a circumplex model as a starting point for classifying the emotional experiences that may underlie political affiliation. Ultimately however, it is our hope that further research will lead to the development of a more refined understanding of the specific neuro-affective systems that enhance conservative orientation.
6.6 Future Directions: Specific Types of Conservative Thought

The content of the political speeches used in Studies 1 and 2 and the topics of the political orientation questionnaires employed in Studies 3 and 4 relate exclusively to social issues. Future research is needed to see if our findings generalize to economic political issues. Social and economic conservatism may be distinct ideologies that appeal to different groups of individuals. For instance, social conservatism has been found to be most prevalent among conservative Protestants, while economic conservatism is most popular among individuals in high-income brackets. Furthermore, there is some evidence that social conservatives are less open-minded and more dogmatic than economic conservatives (Johnson & Tamney, 2001). Future studies should therefore assess the relationship between arousal and distinct components of conservative thought.

Relatedly, future research is needed to investigate the emotional underpinnings of liberal ideology. In Study 1, arousal prompted endorsement of right-wing speeches without affecting agreement with left-wing speeches. Research is needed to determine why this might be the case. Conceivably, liberalism might be motivated by a distinct set of affective factors.

6.7 Future Directions: Extremism theory

Overall, our study does not support extremism theories of political beliefs (e.g., see Eysenck, 1981; Greenberg & Jonas, 2003). According to such theories, threat should motivate extreme political beliefs, regardless of orientation, such that liberals become more extreme in their liberalism and conservatives more entrenched in their conservatism. In Studies 1 and 2, we did not find this type of interaction between baseline political beliefs and experimental induction of positive, negative, or neutral affect. Rather, an overall effect was noted in which emotional arousal enhanced agreement with specifically right-wing political content. Moreover, in Studies 3 and 4, we did not find that extremists exhibited overall greater ERP amplitudes to threat -- or other sorts of stimuli -- compared with moderates. Future work, involving more refined measures of extremism, might further investigate the possibility that extremists and moderates exhibit emotion-processing differences.
6.8 Conclusion

The studies presented in my dissertation suggest that emotional arousal, rather than negativity *per se*, may motivate conservative political orientation. Such a finding has implications for the development and refinement of psychological conceptions of political orientation. The arousal model provides a psychological framework for understanding the contexts that underlie conservative movements. It is my hope that developing an accurate and all encompassing theoretical model of the psychological basis of political orientation will ultimately facilitate a better understanding of the self-regulatory psychological functions served by political beliefs and help to inform which individuals and situations are most conducive to right-wing extremism.
References


Andresen J, (2001). Religion in Mind: Cognitive Perspectives on Religious Belief, Ritual, and...
Experience. Cambridge: Cambridge Univ. Press.


Frontiers in Human Neuroscience, 6, 33-38.


Contemporary Sociology, 35, 346-350.


based to individuating processes: influences of information and motivation on attention


authoritarianism in relation to proposed judicial action, electromyographic response, and

affective attitudes toward a schizophrenic mother. *Journal of Applied Social Psychology, 38*,

215-33.

Forgas, J.P. (2013). Don’t Worry, Be Sad! On the Cognitive, Motivational, and Interpersonal


the basal ganglia differentiates rewards from nonrewards: Temporospatial principal

components analysis and source localization of the feedback negativity. *Human Brain

Mapping, 32*, 2207-2216.

Fraley, R.C., Griffin, B.N., Belsky, J. &Roisman, G.I. (2012). Developmental antecedents of

political ideology: A longitudinal investigation from birth to age 18 years. *Psychological

Science, 23*, 1425-1431.


Oxford, England: W. W. Norton. (Original work published 1933)


Gruenfeld, D. H. (1995). Status, ideology, and integrative ideology on the U.S. Supreme Court:


Inbar, Y., Pizarro, D.A., & Bloom, P. (2009a) Conservatives are more easily disgusted


Harmon-Jones & P. Winkielman (Eds.), Social neuroscience: Integrating biological and psychological explanations of social behavior (pp. 157–175). New York: Guilford Press.


the Big Five personality traits and the Big Six vocational interest types. *Personnel
Psychology, 58*, 447-478.

Nail, P. R., McGregor, I., Drinkwater, A. E., Steele, G. M., & Thompson, A. W. (2009). Threat
causes liberals to think like conservatives. *Journal of Experimental Social Psychology,
45*, 901–907.


*Psychological Science, 19*, 565-572.


mediational model of homophobia. *Journal of Research in Personality, 42*, 1364-1369.

anterior cingulate is not all error related: Expectancy deviation and the representation of

509-522.

1670.

New York: Oxford University Press.


or arousal?. *Emotion, 5, 55-66.*


Wilson, G., & Patterson, J. (1968) A new measure of conservatism. British Journal of


Copyright Acknowledgments

The content of Chapter 4 is currently under review.
More specifically, political orientation is most susceptible to change during adolescence, becomes fully formed in early adulthood, and then remains relatively stable throughout the lifespan.

Although circumplex models are not universally accepted as a comprehensive representation of emotional experience (e.g., see Ekman, 1992; Harmon-Jones, Gable, & Price, 2013; Panksepp, 1998), they provide a useful conceptual framework for considering the most distinctive dimensions of affective experience (Posner et al., 2005).

Note that the Yerkes-Dodson Law (Yerkes & Dodson, 1908) may apply to the relationship between arousal and stereotyping such that extremely low levels of arousal (drowsiness), like high levels of arousal, may enhance reliance on stereotypes (Bodenhausen, 1990).

Our analyses without controlling for the effect of expectation are as follows. FRN amplitudes were not predicted by interactions between electrode site and valence, $b=-.07$, $SE=.28$, $F(1,306.01)=.07$; $p=.793$, $R^2<.01$, electrode site and SJ, $b=.26$, $SE=.29$, $F(1,306.13)=.82$; $p=.365$, $R^2=.01$, electrode site, SJ, and valence, $b=.19$, $SE=.29$, $F(1,306.01)=.44$; $p=.512$, $R^2<.01$. A main effect was noted for electrode region, $b=-1.75$, $SE=.28$, $F(1,306.08)=40.39$; $p=.001$, $R^2=.12$. Moreover, in replication of previous FRN studies (e.g., Hajcak et al., 2006), a main effect of valence was detected ($b=3.00$, $SE=.23$, $F(1,306.08)=177.14$; $p=.001$, $R^2=.37$). In regards to SJ, a main effect upon the FRN was not found, $b=1.49$, $SE=1.15$, $F(1,27.08)=1.68$, $p=.207$, $R^2=.06$. However, a significant interaction between SJ and feedback type in predicting the FRN was noted, $b=.65$, $SE=.24$, $F(1,306.25)=7.43$; $p=.007$, $R^2=.02$. Follow-up simple effects tests revealed that the FRN was significantly differentiated by feedback type among participants both high ($b=3.62$, $SE=.33$, $F(1,306.03)=122.64$, $p=.001$, $R^2=.29$) and low ($b=2.37$, $SE=.32$, $F(1,306.31)=56.59$, $p=.001$, $R^2=.18$) in SJ. SJ was not found to be specifically related to negative feedback ($b=.84$, $SE=1.17$, $F(1,29.28)=.51$, $p=.479$, $R^2=.01$), but was associated (a trend) with enhanced FRN in response to positive feedback ($b=2.14$, $SE=1.18$, $F(1,29.58)=3.30$, $p=.080$, $R^2=.09$).

The failed experimental manipulation consisted of participants watching short film-clips intended to either induce or reduce social dominance orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994). We administered the SDO scale (Pratto et al., 1994), a measure previously found to be reliable and valid (Pratto et al., 1994), before participants engaged in the EEG portion of the experiment. Participants were re-administered a subset of 5 questions from the SDO scale after witnessing one of the film-clips. A repeated measures ANOVA suggested that scores on the SDO scale before the experimental manipulation (M=2.33; SD=.82) did not significantly interact with experimental condition in predicting scores on the SDO scale administered after the film-clip manipulation (M=3.36; SD=.69), F(43)=.45, p=.508, η²=.01. This suggests that the experimental manipulation did not successfully alter SDO. We also conducted an analysis to ensure that this manipulation did not affect LPP amplitudes in response to any stimulus types. In this analysis, we modeled LPP amplitudes as a function of stimuli valence (within-subjects: -1=negative, 1=positive), intensity (within-subjects: -1=low, 1=high), whether the data was collected pre- or post-experimental manipulation (within-subjects: -1=pre manipulation, 1=post manipulation), political orientation (between-subjects: continuous), and the interactions among these variables. Political conservatism did not significantly interact with the pre/post manipulation variable to predict LPP amplitudes, b=-61.21, SE=114.52, F(1,233.77)=.29, p=.594, R²<.01. Conservatism also did not interact with valence and the pre/post manipulation variable (b=58.90, SE=105.74, F(1,227.17)=.31, p=.578, R²<.01) nor with
intensity and the pre/post variable, $b=-143.61, SE=105.41, F(1,226.98)=1.86, p=.174, R^2=.02$, nor was there a 4-way interaction between intensity, valence, conservatism, and the pre/post variable, $b=137.80, SE=105.42, F(1,226.98)=1.71, p=.192, R^2=.02$. Because of the relationship between conservatism and the LPP was not affected by whether the EEG data was collected before or after the failed experimental manipulation, we decided to conduct our analyses without considering whether the LPP was pre or post manipulation.

Interestingly, the ventral tegmental area does not have direct projections to any other primary sensory area, which suggests that dopamine may be especially linked to olfaction.
## Tables

Table 1. Description and arousal ratings for each emotional film clip

<table>
<thead>
<tr>
<th>Name</th>
<th>Brief Description</th>
<th>Length</th>
<th>Emotion</th>
<th>Standardized Arousal Rating (Z-score)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is Something About Mary*</td>
<td>Ben Stiller fights with dog</td>
<td>2:55</td>
<td>Happiness</td>
<td>-.01</td>
</tr>
<tr>
<td>When Harry Met Sally*</td>
<td>Sally simulates orgasm</td>
<td>2:53</td>
<td>Happiness</td>
<td>.32</td>
</tr>
<tr>
<td>Robin Williams Live at The Met**</td>
<td>Alcohol/Marijuana</td>
<td>5:59</td>
<td>Happiness</td>
<td>.93</td>
</tr>
<tr>
<td>The Shining*</td>
<td>Character pursues wife with Axe</td>
<td>4:33</td>
<td>Fear</td>
<td>.55</td>
</tr>
<tr>
<td>The Shining*</td>
<td>Boy looks for mom</td>
<td>1:22</td>
<td>Fear</td>
<td>.02</td>
</tr>
<tr>
<td>It*</td>
<td>Clown in sewer attracts a boy</td>
<td>1:56</td>
<td>Fear</td>
<td>.33</td>
</tr>
<tr>
<td>Trainspotting*</td>
<td>Character dives into filthy toilet</td>
<td>1:44</td>
<td>Disgust</td>
<td>.41</td>
</tr>
<tr>
<td>Condition</td>
<td>Description</td>
<td>Duration</td>
<td>Valence</td>
<td>Intensity</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Pink Flamingos**</td>
<td>Woman eats dog feces</td>
<td>1:17</td>
<td>Disgust</td>
<td>1.24</td>
</tr>
<tr>
<td>Amputation***</td>
<td>Amputation of arm</td>
<td>1:08</td>
<td>Disgust</td>
<td>.80</td>
</tr>
<tr>
<td>Abstract shapes***</td>
<td>Colors shown across the screen</td>
<td>3.26</td>
<td>Neutral</td>
<td>-1.76</td>
</tr>
<tr>
<td>Color bars***</td>
<td>Bars of color shown across the screen</td>
<td>1.31</td>
<td>Neutral</td>
<td>-1.71</td>
</tr>
<tr>
<td>Blue (1)*</td>
<td>A piece of foil floating in the air.</td>
<td>1.16</td>
<td>Neutral</td>
<td>-1.13</td>
</tr>
</tbody>
</table>

*Note.* *= taken from Schaefer, Nils, Sanchez, & Philippot [54]; **= taken from Rottenberg, Ray, & Gross [53]; ***= taken from Gross and Levenson [52].
Table 2. Means, Standard Deviation (SD), and number of participants (N) in each group for Study 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Right-wing speeches</th>
<th>Left-wing speeches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Fear</td>
<td>5.67&lt;sub&gt;b&lt;/sub&gt;</td>
<td>1.80</td>
</tr>
<tr>
<td>Amusement</td>
<td>5.70&lt;sub&gt;b&lt;/sub&gt;</td>
<td>1.87</td>
</tr>
<tr>
<td>Disgust</td>
<td>5.12&lt;sub&gt;b&lt;/sub&gt;</td>
<td>1.65</td>
</tr>
<tr>
<td>Neutral</td>
<td>3.33&lt;sub&gt;a&lt;/sub&gt;</td>
<td>2.26</td>
</tr>
</tbody>
</table>

Note. Different subscripts within a single column denote significantly different mean values ($p<.001$).
Table 3. Means, Standard Deviation (SD), and number of participants (N) in each group for Study 2

<table>
<thead>
<tr>
<th>Condition</th>
<th>Right-wing speeches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
</tr>
<tr>
<td>Fear (amplify reaction)</td>
<td>5.85$_c$</td>
</tr>
<tr>
<td>Fear (watch naturally)</td>
<td>4.37$_b$</td>
</tr>
<tr>
<td>Amusement (amplify reaction)</td>
<td>5.70$_c$</td>
</tr>
<tr>
<td>Amusement (watch naturally)</td>
<td>5.18$_c$</td>
</tr>
<tr>
<td>Neutral</td>
<td>3.12$_a$</td>
</tr>
</tbody>
</table>

*Note.* Different subscripts within a single column denote significantly different mean values ($p<.01$).
Table 4. The first two rows of table 1 indicate the standardized intensity and valance ratings of the IAPS images used in our study, which were reported by Lang and colleagues (1997). High scores reflect more positive versus negative valence and more arousing versus less arousing content. The 3rd and 4th rows of this table report ratings of intensity and valence by participants in our own study (N=43) about a subset of 5 images from each category. High scores reflect more positive versus negative valence and more arousing versus less arousing content. The 5th and 6th rows in this table report correlations between the social conservatism scale (SCS; Henningham, 1995; Wilson & Patterson, 1968) and the ratings of intensity and valence provided by participants in our study. Finally, the 7th row of this table reports LPP amplitudes (µv), evidenced 400-700 ms post stimulus exposure at electrode Pz, during our experiment in response to each stimulus type, regardless of whether the data was collected pre or post failed experimental manipulation.

<table>
<thead>
<tr>
<th></th>
<th>High intensity pleasant IAPS (only erotic content; 12 images)</th>
<th>High intensity pleasant IAPS (No erotic content included; 18 images)</th>
<th>High intensity unpleasant IAPS (30 images)</th>
<th>Low intensity pleasant IAPS (30 images)</th>
<th>Low intensity unpleasant IAPS (30 images)</th>
<th>Neutral IAPS (30 images)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized valence ratings</td>
<td>6.35&lt;sub&gt;a&lt;/sub&gt;</td>
<td>7.12&lt;sub&gt;b&lt;/sub&gt;</td>
<td>2.35&lt;sub&gt;c&lt;/sub&gt;</td>
<td>7.01&lt;sub&gt;b&lt;/sub&gt;</td>
<td>3.76&lt;sub&gt;d&lt;/sub&gt;</td>
<td>5.79&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>(.80)</td>
<td>(.67)</td>
<td>(.75)</td>
<td>(.65)</td>
<td>(1.03)</td>
<td>(1.09)</td>
</tr>
<tr>
<td>Standardized intensity ratings</td>
<td>5.80&lt;sub&gt;a&lt;/sub&gt;</td>
<td>5.78&lt;sub&gt;a&lt;/sub&gt;</td>
<td>6.55&lt;sub&gt;b&lt;/sub&gt;</td>
<td>3.63&lt;sub&gt;c&lt;/sub&gt;</td>
<td>3.96&lt;sub&gt;c&lt;/sub&gt;</td>
<td>3.80&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>(.79)</td>
<td>(.96)</td>
<td>(.65)</td>
<td>(.72)</td>
<td>(.97)</td>
<td>(1.16)</td>
</tr>
<tr>
<td></td>
<td>Rating 1</td>
<td>Rating 2</td>
<td>Rating 3</td>
<td>Rating 4</td>
<td>Rating 5</td>
<td>Rating 6</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Participant valence ratings</td>
<td>4.58&lt;sub&gt;a&lt;/sub&gt;</td>
<td>7.40&lt;sub&gt;b&lt;/sub&gt;</td>
<td>2.80&lt;sub&gt;c&lt;/sub&gt;</td>
<td>7.96&lt;sub&gt;d&lt;/sub&gt;</td>
<td>3.10&lt;sub&gt;c&lt;/sub&gt;</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(3.04)</td>
<td>(1.28)</td>
<td>(1.03)</td>
<td>(1.56)</td>
<td>(1.02)</td>
<td></td>
</tr>
<tr>
<td>Participant intensity ratings</td>
<td>5.62&lt;sub&gt;a&lt;/sub&gt;</td>
<td>6.02&lt;sub&gt;a&lt;/sub&gt;</td>
<td>7.09&lt;sub&gt;b&lt;/sub&gt;</td>
<td>3.61&lt;sub&gt;c&lt;/sub&gt;</td>
<td>6.40&lt;sub&gt;d&lt;/sub&gt;</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(2.13)</td>
<td>(1.54)</td>
<td>(1.56)</td>
<td>(1.79)</td>
<td>(1.40)</td>
<td></td>
</tr>
<tr>
<td>Correlation between the SCS and valence ratings</td>
<td>-.32&lt;sup&gt;*a&lt;/sup&gt;</td>
<td>-.10&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.03&lt;sub&gt;a&lt;/sub&gt;</td>
<td>-.09&lt;sub&gt;a&lt;/sub&gt;</td>
<td>-.19&lt;sub&gt;a&lt;/sub&gt;</td>
<td>--</td>
</tr>
<tr>
<td>Correlation between the SCS and intensity ratings</td>
<td>-.02&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.20&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.01&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.05&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.03&lt;sub&gt;a&lt;/sub&gt;</td>
<td>--</td>
</tr>
<tr>
<td>LPP mean amplitude (µV)</td>
<td>4535.56&lt;sub&gt;a&lt;/sub&gt;</td>
<td>2271.72&lt;sub&gt;b&lt;/sub&gt;</td>
<td>2698.49&lt;sub&gt;b&lt;/sub&gt;</td>
<td>1380.26&lt;sub&gt;c&lt;/sub&gt;</td>
<td>1327.36&lt;sub&gt;c&lt;/sub&gt;</td>
<td>1129.11&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>(3136.52)</td>
<td>(2632.49)</td>
<td>(2409.50)</td>
<td>(2458.34)</td>
<td>(2228.81)</td>
<td>(2342.06)</td>
</tr>
</tbody>
</table>
Correlation between the SCS and the LPP (µv) for each stimulus type

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.11&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.15&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.24&lt;sub&gt;a&lt;/sub&gt;</td>
<td>.42&lt;sup&gt;**a&lt;/sup&gt;</td>
<td>.34&lt;sup&gt;*a&lt;/sup&gt;</td>
<td>.35&lt;sup&gt;*a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**Note.** IAPS=International affective picture system; LPP=Late positive potential; *=significant p<.05; **=significant p<.01. Different subscripts within a row denote significantly different values assessed with t-tests, p<.05.
Mean agreement with political speeches

Speech Type
- Left-wing
- Right-wing

Type of film clip witnessed

Error Bars: 95% Confidence interval
Mean agreement with right-wing speeches

Condition

Neutral (no instructions)  Threat (watch naturally)  Amusing (watch naturally)  Amusing (amplify reaction)  Threatening (amplify reaction)

Error Bars: 95% Confidence interval