Ideological Reactivity: Political Conservatism and Brain Responsivity to Emotional and Neutral Stimuli

Article *in* Emotion · June 2016

DOI: 10.1037/emo0000150

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Ideological reactivity: Political conservatism and brain responsivity to emotional and neutral stimuli.

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Re-submission date: September 29, 2015

Word Count: 5,568

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Abstract

Conservatives are often thought to have a negativity bias – responding more intensely to negative than positive information. Yet, recent research has found that greater endorsement of conservative beliefs follow from both positive and negative emotion inductions. This suggests that the role of affect in political thought may not be restricted to negative valence, and more attention should be given to how conservatives and liberals respond to a wider range of stimulation. In this vein, we examined neural responses to a full range of affective stimuli, allowing us to examine how self-reported ideology moderated these responses. Specifically, we explored the relationship between political orientation and two event related potentials (one late and one early) previously shown to covary with the subjective motivational salience of stimuli—in response to photographs with standardized ratings of arousal and valence. At late time points, conservatives exhibited sustained heightened reactivity, compared to liberals, specifically in response to relatively un-arousing and neutral stimuli. At early time points, conservatives exhibited somewhat enhanced neural activity in response to all stimulus types compared to liberals. These results may suggest that conservatives experience a wide variety of stimuli in their environment with increased motivational salience, including positive, neutral, and low-arousal stimuli. No effects of valence were found in this investigation. Such findings have implications for the development and refinement of psychological conceptions of political orientation.

Late positive potential; early posterior negativity; political conservatism; ideology; social neuroscience.

Ideological reactivity: Political conservatism and brain responsivity to emotional and neutral stimuli

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. For example, people with larger negativity biases – a tendency to attend to, process, and weight negative or risky information more so than positive -- have been found to report more conservative political attitudes (e.g., Shook & Fazio, 2009; see Hibbing, Smith, & Alford, 2014 for review). In addition to this negativity bias, other emotional mechanisms also play a role. For instance, being easily aroused, in general, may help create the mindsets that lead to conservative worldviews. In this study, we investigate the possibility that individuals who react to the stimuli that they encounter with enhanced or sustained intensity, regardless of the valence of those stimuli, may be inclined to endorse more conservative versus liberal ideologies.

Emotional Processing Among Conservatives

Psychologists have explored the possibility that different psychological needs enhance the appeal of right versus left 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 (1933/1965), the book put forward a psychodynamic conception of the prototypical right-wing fascist as a psychological defense elicited in response to anxiety. Modern conceptualizations of right-wing ideology

have followed in this tradition, tending to highlight the relationship between conservatism and anxiety-related negative emotions such as threat, uncertainty (Jost, Glaser, Kruglanski, & Sulloway, 2003), and disgust (e.g., Inbar, Pizarro, & Bloom, 2009). Although this focus has generated a significant amount of support for this specific hypothesis, it has come at the cost of neglecting other aspects of emotional processing in ideological processing. Specifically, this near exclusive attention to negative emotion has left the role of positive emotion – or emotional arousal in general -- in shaping belief systems relatively unexplored.

In attempting to fill this gap, we have recently found preliminary support for the idea that experimentally manipulated emotional states – whether negative *or positive* – led to greater support for conservative beliefs. In particular, in two studies we have found that participants agreed more with right but not left-wing political speeches after being exposed to amusing as well as fear and disgust-inducing film-clips (Tritt, Inzlicht, & Peterson, 2013). Because the amusing clips were positive in valence, this provides initial support for the notion that positive as well as negative emotion states may enhance conservatism. Emotional arousal, regardless of whether positive or negative in valence, has been linked to cognitive rigidity, the use of heuristics and stereotypes, engagement in dominant response tendencies, and reduced controlled cognitive processing (see Strack & Deutsch, 2004; Schimmack, 2005). Each of these cognitive processes has been linked to a preference for conservative versus liberal ideology (see Eidelman, Crandall, Goodman, & Blanchar, 2012; Jost et al., 2003). To the extent that emotional arousal can make conservative ideas more acceptable, individuals who tend to experience more emotional arousal in response to the stimuli that they encounter in their environment, may be more

likely to endorse conservative ideologies.

In this paper, we examine how different degrees of reactivity to various stimuli are associated with the endorsement of conservative (relative to liberal) ideologies. According to circumplex models of emotion (Posner, Russell, & Peterson, 2005; Russell, 1980), all affective experience may be conceived as combinations of two dimensions: valence and arousal. The field of political psychology has tended to confound valence and arousal dimensions. Conservatives have previously been found to exhibit physiological sensitivity to arousing negative versus neutral stimuli (Dodd et al., 2012; Fodor, Wick, Hartsen, & Preve, 2008; Oxley et al., 2008; Smith, Oxley, Hibbing, Alford, & Hibbing, 2011), to arousing negative compared to less intense positive information (Carraro, Castelli, & Macchiella, 2011; Dodd et al., 2012; McLean et al., in press), and to mildly positive stimuli (Tritt, Page-Gould, Peterson, & Inzlicht, 2014). Studies have not yet assessed the relationship between political orientation and physiological sensitivity to emotional stimuli *purposefully* varied in terms of arousal as well as valence. To complete this picture, we used evoked electrical brain potentials to examine physiological sensitivity to emotional stimuli with standardized ratings of valence and arousal among individuals with different political orientations.

Critically, we examined reactivity to stimuli varying in terms of emotional arousal and valence, controlling for the relative impact of each, in relation to political orientation. Doing so allows us to examine several possibilities for the relationship between reactivity and ideology. First, it is possible that individuals who exhibit a negativity bias -- sensitivity to specifically negative valence stimuli -- will report more conservative beliefs. Such a finding would be consistent with the negative valence hypothesis (see

Hibbing et al., 2014), which suggests that negative emotion encourages conservative mindsets. Second, it is possible that individuals who are sensitive to arousing stimuli, regardless of the valence of those stimuli, will endorse more conservative political beliefs. Such a finding would be consistent with an arousal hypothesis (see Tritt, Peterson, & Inzlicht, 2014), which suggests that high arousal emotions lead to conservative mindsets. Third, individuals who display heightened and sustained reactivity to all stimuli, even those that are not particularly intense, might report more conservative beliefs. This would suggest that conservatives may have a relatively low threshold of perceiving stimuli to be motivationally salient. Insofar as motivational salience promotes arousal, such a possibility would be consistent with Eysenck (1954), who proposed that extreme conservatives have a relatively low threshold of arousal, whereas extreme liberals have a relatively high threshold of arousal. Such a finding would also be consistent with the notion that arousal leads to conservative mindsets (see Tritt et al., 2014).

The Late Positive Potential and the Early Posterior Negativity

We examined neural reactivity to stimuli with event-related potentials (ERPs), which index 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 two specific components of the ERP: the Late Positive Potential (LPP) and the early posterior negativity (EPN).

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 up to several seconds following stimulus presentation (Holmes et al.,

2008). Its amplitude is consistently found to be modulated by the subjective motivational salience of a stimulus such that it increases in proportion to emotional significance of the stimulus for a particular individual (e.g., Hajcak & Olvet, 2008; Moser et al., 2006). Pleasant and unpleasant stimuli, for example, tend to elicit larger LPPs than neutral stimuli (e.g., Hajcak & Olvet, 2008), and LPPs has been found to increase in relation to subjective ratings of emotional arousal (e.g., Hajcak & Olvet, 2008).

The LPP has been used to index individual differences in the motivational salience of particular types of information for specific populations. For instance, spider phobic patients, compared to controls, have been found to exhibit heightened LPP specifically in response to pictures of spiders, but not other sorts of threatening stimuli (Schienle, Schafer, & Naumann, 2008). Moreover, 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. In this context, the LPP may be conceived as an index of the subjective motivational salience of a stimulus for a particular individual (e.g., Ito, Larsen, Smith, & Cacioppo, 1998).

We assessed, as well, the EPN, which is an early negative deflection in the ERP that arises approximately 240 ms after stimulus presentation at occipital recording sites (e.g., Weinberg & Hajcak, 2010). The EPN has been noted to be among the earliest cortical ERP components that reflect the selective processing of emotional stimuli (Schupp, Junghfer, Weike, & Hamm, 2003b). Whereas the LPP is thought to reflect sustained attention (e.g., Hajcak & Olvet, 2008), the EPN is thought to reflect early perceptual encoding (Schupp, Junghfer, Weike, & Hamm, 2003a). Specifically, the EPN

may indicate enhanced perceptual encoding and activity in the visual cortex (see Schupp et al., 2003a). Its amplitude is consistently found to be modulated by the motivational salience of a stimulus (e.g., Schupp et al., 2003b; Weinberg & Hajcak, 2010). For instance, the EPN has been noted to be amplified in response to erotic pictures and pictures depicting mutilation scenes compared to less arousing, neutral pictures (e.g., Schupp et al., 2003a; Schupp et al., 2003b; Weinberg & Hajcak, 2010).

The EPN, like the LPP, has been employed to index individual differences in the motivational salience of particular types of information for specific populations. For instance, individuals with social anxiety have exhibited enhanced EPN specifically in response to fearful and angry faces, reflecting the intense motivational significance of such stimuli for this population (Muhlberger et al., 2008). In this context, the EPN may be conceived as an index of the subjective motivational salience of a stimulus for a particular individual (e.g., Muhlberger et al., 2008). We accordingly assess the EPN in order to gauge early visual processing of emotional stimuli among participants with liberal versus conservative political persuasions. Assessing the EPN as well as the LPP allows us to examine initial perceptual encoding in addition to sustained attention, thereby achieving a relatively comprehensive picture of neural responsivity to emotional and neutral stimuli in relation to political belief.

Study Overview

In this study, we examine the relationship between individual differences in political orientation and the amplitude of a late and an early ERP component in response to photographs that were either positive or negative in valence and were either arousing or non-arousing in terms of affective salience. This allowed us to test three possibilities.

First, negativity bias, which would be evidenced by greater LPP and EPN amplitudes specifically in response to stimuli of negative valence, might be associated with conservatism relative to liberalism. Second, arousal bias, evidenced by greater LPP and EPN amplitudes specifically in response to stimuli that are high in emotional arousal, might be correlated with conservatism relative to liberalism. Third, a relatively low threshold of subjective motivational salience, which would be suggested by enhanced LPP and EPN amplitudes in response to all stimuli, particularly those that are not especially arousing or valenced (i.e., neutral stimuli), might be associated with conservatism relative to liberalism. To be clear, we expect that all participants will exhibit heightened LPP and EPN in response to highly arousing stimuli. Therefore, a relatively low threshold of subjective salience will be suggested by enhanced LPPs and EPNs specifically in response to low arousal and neutral stimuli. Broadly speaking, we sought to assess whether conservatives are sensitive to the arousal dimension of emotional stimuli, and/ or the valence dimension of emotional stimuli, while controlling for the relative impact of each. Our ultimate aim is to better understand the emotional processing correlates of conservative versus liberal belief.

We assessed social conservatism, specifically, as opposed to economic conservatism. Social issues such as personal rights (i.e., equality) and freedom of religion are commonly distinguished from economic issues such as taxation in political science (e.g., see Malka, Soto, Inzlicht, & Lelkes, 2014). Although a great deal of research and theory has linked right- versus left-wing political orientation to emotional trait differences involving uncertainty and threat, a recent review of past research by Malka and colleagues (2014) found that needs to manage uncertainty and threat predict social

conservatism, but not necessarily economic conservatism. We accordingly focused our inquiry upon social conservatism since we are interested in the relationship between political orientation and emotional processing.

Methods

Participants

43 individuals (26 males; mean age=18.83; SD=2.36) from an introductory psychology course at the University of Toronto Scarborough participated in exchange for course credit. This campus of University of Toronto is exceptionally diverse. Unlike typical college student samples, which tend to be predominantly liberal, student samples at the Scarborough campus of the University of Toronto tend to have a relatively equal number of liberals and conservatives. In terms of race, 7 identified as white; 2 as black; 9 as East Asian; 18 as South Asian; 3 as middle eastern; 2 as Latino; and 5 as biracial. One participant did not complete the self-report questionnaires, which left a final sample of 42.

Political Orientation

We administered the 12-item social conservatism scale (SCS), which 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.” (We removed “Asian immigration”, one of the items of the SCS, from our analyses because the results would have been difficult to interpret given that our sample was composed of a large number of self-identified Asians.) 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 reflect more conservative political beliefs. The data were normally distributed with a sample mean of 4.27 (*SD*=.82; range=4.08) and the scale was reliable in our sample (Cronbach's α = .75), indicating that our sample was not especially liberal, even slightly conservative.

It is somewhat unusual to find such an even distribution of liberals and conservatives in a college student sample on the SCS (e.g., Dollinger, 2007; Heaven & Oxman, 1999). For instance, in the Henningham (1995) validation paper, the 12-item questionnaire was coded on a 3-item scale (3-points for yes, 2-points for not sure, and 1-point for no with liberal items inversely coded so that higher scores reflect more conservative responses). Sums were calculated for each participant and the sample obtained a mean of 22.00 (SD = 5.00). Our more normally distributed sample means, which are more conservative than typical college student samples, may likely be attributed to the exceptional diversity of the undergraduate population at the Scarborough campus of the University of Toronto.

Photograph Stimuli

We selected 150 pictures from the International Affective Picture System (IAPS)[1]. The IAPS is a set of images that have been given standardized ratings based on arousal and valence (Lang, Bradley, & Cuthbert, 1997). 30 pictures were selected for each valance/ arousal category (high arousal pleasant, low arousal pleasant, high arousal unpleasant, low arousal unpleasant) based on standardized ratings. In addition, we included 30 neutral pictures, which were low in arousal and un-valenced.

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, threatening animals, 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. See footnote #1 for a description of each image in each category. The standardized mean arousal and valence ratings of our experimental stimuli are listed in Table 1. As can be seen in this table, high arousal photographs were significantly more intense than low arousal photographs and positively valence stimuli were significantly more pleasant in valence than negative stimuli.

At the end of the experiment, participants were asked to rate a subset of the same 5 images from each category (i.e., high-arousal pleasant, high-arousal unpleasant, low-arousal pleasant, low-arousal unpleasant), which were selected randomly. Participants 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 means and SDs of these ratings are presented in Table 1 along with their correlations with the social conservatism scale.

The picture-viewing task

Participants were instructed to view a series of images, each presented for 2000 ms, that followed a fixation cross presented for 1522-2087 ms. Previous research that has examined the LPP and the EPN has employed a varying inter-trial interval of approximately of 1500-2000ms (e.g., Kujawa, Klein, & Hajcak Proudfit, 2013; Muhlberger et al., 2008). Images were presented once in random order (comprising a total of 150 trials). It is common practice to present IAPS images of varying intensities

and valences randomly in LPP (e.g., Weinberg & Hajcak, 2010) and EPN (Schupp et al., 2003b) paradigms. After the 30th, 60th, 90th, and 120th trials, participants were prompted to relax and take a break and to press a key when they were ready to continue. This passive picture-viewing paradigm was completed two times. In between the first and second administration of the picture-viewing paradigm, participants completed a failed experimental manipulation, which was intended as a completely separate and unrelated experiment investigating the impact of experimentally induced social dominance orientation upon ERPs[2].

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[3] and 30 Hz (24dB IIR filter). 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 and EPNs were calculated for each stimulus type: high-arousal positive, high-arousal negative, low-arousal positive, low-arousal negative, and neutral. We believe that it was important to include erotic content in our high arousal positive stimuli category because it is the most motivationally salient category of positive IAPS stimuli. However, because it is possible that conservatives have a more negative or ambivalent response to erotic images (e.g., see Kurzban, Dukes, & Weednen, 2010), we computed separate estimates for the high-arousal positive erotic and non-erotic stimuli. We scored the LPP at the midline cite Pz, which is where this ERP component has been found to be maximally located (e.g., Cacioppo, Crites, Gardner, Berntson, 1994; 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 1a).[4] We scored the LPP as the mean amplitude between 400–1000 ms following stimulus onset, as done by Kujawa and colleagues (2013). We scored the EPN as the average activity at left and right occipital sites, O1 and O2, as done by others (e.g., Muhlberger et al., 2008; Weinberg & Hajcak, 2010). Inspection of topographical headmaps confirmed that, in our dataset, the ERP responses to arousing versus neutral stimuli were most significantly differentiated in the time window of the EPN at left and right occipital sites (see Figure 1b). We scored the EPN as the mean amplitude in the time window of 210-310 ms, which is in line with what past researchers have done and is consistent with inspection of our waveform graph

(Figures 1d and 1e; e.g., Weingberg & Hajcak, 2010). Each participant's average included a minimum of 13 artifact-free trials, a number that exceeds the minimum for maintaining reliability of similar ERP components (Cohen & Polich, 1997; see Figures 1c, 1d, and 1e for waveform graphs).

Results

Self-Reported Valence and Arousal Ratings Among Conservatives.

Participants rated a subset of images from each category based on valence and arousal dimensions. We conducted correlations 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 1. As can be seen from this Table, conservatism was associated with rating erotic images as relatively less pleasant (a trend), which is consistent with past findings (Kurzban et al., 2010). Political orientation was not correlated with self-report ratings of any other stimulus type.

Event Related Potential Amplitudes Among Conservatives.

In order to account for a mixed design with a continuous predictor, we used multilevel modeling to analyze our data. 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). The omnibus models included the effect-coded arousal (within-subjects: -1=low, 1=high) and valence (within-subjects: -1=negative, 1=positive) variables and mean-centered conservatism (between-subjects: continuous), as well as their interactions, in predicting LPP and EPN amplitudes. Because it is possible that conservatives may have a more negative or

ambivalent response to erotic stimuli (Kurzban et al., 2010) and because the conservatives in our sample rated erotic content as less positive (a trend), 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

We found a main effect of stimulus arousal upon LPP amplitudes (b=2.23, SE=.19, $F(1,326.81)$=135.60, p=.001, R^2=.29) whereby the amplitude of the LPP was more positive in response to arousing compared to non-arousing stimuli. We did not find a significant main effect of valence upon LPP amplitudes (b=.26, SE=.21, $F(1,326.81)$=1.55, p=.214, R^2<.01) (see Figure 1a and 1c for headmaps and waveform graph and Table 1 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).

We noted a trend of an interaction between valence and arousal in predicting LPP amplitudes, b=.36, SE=.21, $F(1,326.81)$=3.03, p=.083, R^2=.01. Our follow-up simple effects tests, conducted following the methods of Aiken and West (1991), suggested that arousal was significantly positively related to the LPP irrespective of whether stimuli were positively (b=2.63, SE=.26, $F(1,322.97)$=101.53, p=.001, R^2=.24) or negatively (b=1.76, SE=.30, $F(1,322.95)$=35.33, p=.001, R^2=.10) valenced. However, valence had a significant impact upon the LPP when stimuli were highly arousing (a trend; b=.63, SE=.33, $F(1,322.84)$=3.63, p=.057, R^2=.01) but not when stimuli were less arousing, b=-.10, SE=.32, $F(1,322.84)$=.10, p=.753, R^2<.01. See Figure 1c and Table 1.

When we re-ran our analysis with erotic content removed, we still noted a main effect of arousal upon LPP amplitudes (b=1.57, SE=.19, $F(1,326.81)$=66.25, p=.001,

R^2=.17) whereby the amplitude of the LPP was more positive in response to arousing compared to non-arousing stimuli. We also found a trend of valence upon LPP amplitudes, (*b*=-.41, *SE*=.21, *F(*1,326.82)=3.72, *p*=.055, R^2=.01). We no longer noted an interaction between valence and arousal in predicting LPP amplitudes, *b*=-.30, *SE*=.21, *F(*1,326.82)=2.03, *p*=.156, R^2<.01.

The Effect of Conservatism Upon LPP Amplitudes

We did not find a main effect of conservatism versus liberalism upon LPP amplitudes, *b*=1.30, *SE*=.93, *F(*1,40.21)=1.97, *p*=.168, R^2=.05. However, we found a significant interaction between conservatism and arousal in predicting LPP amplitudes, *b*=-.69, *SE*=.23, *F(*1,326.81)=9.02, *p*=.003, R^2=.03. Our follow-up simple effects tests suggested that there was a significant simple effect of conservatism upon stimuli that were low in arousal, *b*=1.94, *SE*=.96, *F(*1,46.20)=4.13, *p*=.048, R^2=.08, but the effect of conservatism among stimuli that were high in arousal was not statistically significant (*b*=.83, *SE*=.96, *F(*1,46.13)=.76, *p*=.387, R^2=.02). In other words, conservatives exhibited enhanced LPP compared to liberals specifically in response to stimuli with lower standardized arousal ratings (see Figures 2a, 2b). Follow-up simple effects tests revealed that arousal was significantly related to amplified LPP amplitudes among participants both high (*b*=1.64, *SE*=.27, *F(*1,326.80)=35.80, *p*=.001, R^2=.10) and low (*b*=2.82, *SE*=.27, *F(*1,326.81)=107.09, *p*=.001, R^2=.25) in conservatism. That is, the LPP was affected by arousal for both conservatives and liberals, but the significant interaction suggests that it was liberals who showed the larger difference between stimuli that were low versus high in arousal. We did not find a significant interaction between conservatism and valence, *b*=.22, *SE*=.25, *F(*1,326.81)=.75, *p*=.388, R^2<.01, nor did we

find a 3-way interaction between conservatism, arousal, and valence, b=-.19, SE=.25, $F(1,326.81)$=.55, p=.460, R^2<.01, in predicting LPP amplitudes.

We re-ran our analysis, omitting erotic content stimuli. This did not alter the significance of any of our findings with regards to conservatism. We did not find a main effect of conservatism upon LPP amplitudes, b=1.29, SE=.96, $F(1,40.19)$=1.82, p=.185, R^2=.04. However, we found a significant interaction between conservatism and arousal in predicting LPP amplitudes, b=-7.12, SE=.23, $F(1,326.81)$=9.57, p=.002, R^2=.03, which was in the same direction as we found when erotic stimuli were included in the analysis. We did not find a significant interaction between conservatism and valence in predicting LPP amplitudes, b=.19, SE=.25, $F(1,326.82)$=.58, p=.447, R^2<.01, nor did we find a 3-way interaction between conservatism, arousal, and valence, b=-.21, SE=.25, $F(1,326.82)$=.68, p=.409, R^2<.01.

The Effect of Valence and Arousal Upon EPN Amplitudes

We noted a main effect of arousal upon EPN amplitudes (b=-1.09, SE=.15, $F(1,327.05)$=55.03, p=.001, R^2=.14) whereby there was a more negative deflection of the EPN in response to arousing compared to non-arousing stimuli. We also found a trend of a main effect of valence upon EPN amplitudes (b=-.30, SE=.16, $F(1,327.05)$=3.50, p=.062, R^2=.01) such that the EPN had a more negative deflection for positive versus negative stimuli. We did not find a significant interaction between valence and arousal in predicting EPN amplitudes, b=-.13, SE=.16, $F(1,327.05)$=.63, p=.430, R^2<.01. See Figures 1d and 1e and Table 1 for means and SDs.

When we re-ran our analysis of the EPN with erotic content removed, we continued to note a main effect of arousal (b=-.66, SE=.14, $F(1,327.04)$=21.75, p=.001,

R^2=.06). However, there was no main effect of valence, *b*=.13, *SE*=.15, *F(*1,327.04)=.74, *p*=.392, R^2<.01. We also found a trend of an interaction between valence and arousal, *b*=.30, *SE*=.15, *F(*1,327.04)=3.78, *p*=.053, R^2=.01, such that when stimuli were low in arousal, valence did not have a significant effect on the EPN, *b*=.17, *SE*=.22, *F(*1,327.05)=.59, *p*=.443, R^2<.01. However, when stimuli were high in arousal, negative valence was associated with a significantly more negative deflection in the EPN, *b*=.43, *SE*=.22, *F(*1,327.04)=3.91, *p*=.049, R^2=.01.

Taken together, this pattern of results suggests that the EPN exhibited a more negative deflection in response to high arousal stimuli – particularly those of evolutionary significance (erotic stimuli and high arousal threatening stimuli). The finding that the EPN is most negative in response to erotic content and threat/mutilation images, replicates past ERP work (e.g., Schupp et al., 2003a; Schupp et al., 2003b; Weinberg & Hajcak, 2010).

The Effect of Conservatism Upon EPN Amplitudes

We noted a trend of a main effect of conservatism versus liberalism upon EPN amplitudes (*b*=-1.72, *SE*=.98, *F(*1,40.27)=3.06, *p*=.088, R^2=.07) such that conservatives exhibited more negative deflections of the EPN in response to all stimuli. We did not find any significant interactions between conservatism and arousal (*b*=-.13, *SE*=.18, *F(*1,327.05)=.58, *p*=.446, R^2<.01) or between conservatism and valence (*b*=-.10, *SE*=.19, *F(*1,327.05)=.27, *p*=.605, R^2<.01) in predicting EPN amplitudes. Nor did we find a 3-way interaction between conservatism, arousal, and valence in predicting EPN amplitudes, *b*=-.06, *SE*=.19, *F(*1,327.05)=.10, *p*=.748, R^2<.01. See Figures 2c, 2d.

When we re-ran our analysis of the EPN with erotic content removed, the significance of all of our findings with regards to conservatism remained unchanged. We continued to note a trend of a main effect of conservatism versus liberalism upon EPN amplitudes (b=-1.86, SE=1.00, $F(1,40.24)$=3.49, p=.069, R^2=.08) such that conservatives exhibited more negative deflections of the EPN in response to all stimuli. We did not find any significant interactions between conservatism and arousal (b=-.24, SE=.17, $F(1,327.04)$=2.08, p=.150, R^2<.01) or between conservatism and valence (b=-.21, SE=.18, $F(1,327.04)$=1.24, p=.267, R^2<.01) in predicting EPN amplitudes. Nor did we find a 3-way interaction between conservatism, arousal, and valence in predicting EPN amplitudes, b=-.17, SE=.18, $F(1,327.04)$=.89, p=.345, R^2<.01.

Correlations Between Conservatism and ERPs in Response to Specific Stimulus Types

We conducted correlation analyses to see if conservatism-liberalism was related to LPP and EPN amplitude responses to each specific type of stimuli (i.e., high arousal positive, high arousal negative, low arousal positive, low arousal negative, and neutral). These results are reported in Table 1 and depicted with scatterplots in Figure 2. Trends of significant correlations were noted between political ideology and EPN amplitudes in response to every stimulus type (besides erotic) and to LPP amplitudes in response to neutral and low arousal positive stimuli, such that conservatives seemed to have heightened early EPN amplitude responses to all stimuli and sustained LPP amplitudes in response to relatively valence free and un-arousing stimuli.

Discussion

Our study examined the relationship between political orientation and neural reactivity to arousing and non-arousing, positively and negatively valenced stimuli, as well as neutral stimuli with the ultimate goal of testing 3 alternative hypotheses. Specifically, whether conservative political attitudes would be predicted by 1) a negativity bias, 2) an arousal bias, or 3) a relatively low threshold of subjective motivational salience. We found support for the latter hypothesis. At early time points, conservatives, compared to liberals, exhibited somewhat larger EPN amplitudes in response to all stimuli, which may suggest an early visual processing and perceptual encoding bias for stimuli, regardless of their valence or intensity. At late time points, conservatives evidenced larger LPPs than liberals specifically in response to relatively un-arousing stimuli, which may suggest sustained attentional responses to stimuli not typically considered to be salient. In this context, it seems that conservatives may have a low threshold for finding stimuli to be motivationally salient, without displaying special sensitivity to those high-arousal emotional stimuli that should really capture attention such as erotic content, cocked guns, and pictures of animals baring their teeth. Indeed, our study suggested that conservatives demonstrate heightened reactivity not only to mild-arousal affective stimuli, but also to neutral stimuli. Greater sustained attention towards neutral stimuli might suggest that conservatives are slower to disengage from perceptual information that is not typically considered to be of importance.

Our study finding that conservatives experience environmental stimuli with heightened motivational salience is consistent with past theory and recent research. For instance, this notion is consistent with Eysenck's (1954) proposal that extreme conservatives have a relatively low threshold of experiencing arousal, whereas extreme

liberals have a relatively high threshold of experiencing arousal -- at least insofar as motivational salience produces arousal. The idea that conservatives experience stimuli with heightened motivational salience is also consistent with recent neurobiological findings. Enhanced volume (Kanai, Feilden, Firth, & Rees, 2011) and activity (Schreiber et al., 2013) of the amygdala has been found among conservatives. Although these findings are typically proposed to provide evidence for the negativity bias in political orientation, this conclusion rests on the reverse inference that the amygdala is responsive to threat and threat alone. The amygdala responds not only to aversive cues, but also appetitive, novel, rare, and more generally motivationally relevant cues (see Cunningham & Brosch, 2012 for a review). Therefore, the finding of enhanced volume (Kanai, Feilden, Firth, & Rees, 2011) and activity (Schreiber et al., 2013) of the amygdala among conservatives is consistent with the notion that this political orientation is associated with heightened neural reactivity to positive, negative, and even neutral environmental stimuli. Finally, the idea that conservatives experience environmental stimuli with heightened motivational salience is also consistent with a recent study, which suggested that system justification—a specific aspect of conservative ideology defined as the endorsement/ rationalization of the current, social, economic, or political system (Jost & Banaji, 1994)—was associated with heightened activity in regions of the brain associated with reward processing in response to low arousal positive stimuli (positive feedback on a time estimation task; Tritt et al., 2014). Our current study builds on this finding, suggesting that social conservatism is associated with heightened neural reactivity to low arousal stimuli that are positive as well as negative in valence. Taken together, it seems that distinct emotional states such as threat and uncertainty (Jost et al., 2003), disgust

(e.g., Inbar et al., 2009), and happiness (e.g., Schlenker, Chambers, & Le, 2012), which have previously been linked in separate lines of research to political conservatism, may be specific examples that reflect a broader tendency for conservatives to experience stimuli with a heightened and sustained intensity.

Low Threshold of Arousal and the Development of Conservative Ideology

Individuals with a low threshold of finding the stimuli in their environment to be motivationally salient – and consequently experiencing emotional arousal in response to the stimuli that they encounter in their environment--over time, may develop conservative orientation. We speculate that emotional arousal may lead to cognitive processing style changes that enhance the appeal of conservative ideology. Arousal is an important determinant of the types of cognitive processing styles that are engaged by individuals (see Strack & Deutsch, 2004 for review). Emotional arousal has been found to promote cognitive rigidity versus flexibility (Braem, Verguts, & Notebaert, 2011; Demanet, Liefooghe, & Verbruggen, 2011), to encourage the use of heuristics and stereotypes (e.g., Bodenhausen, 1993; Paulhus & Lim, 1994; see Strack & Deutsch, 2004), to lead individuals to engage in dominant response tendencies (Hull, 1943; Zajonc, 1965; see Strack & Deutsch, 2004), and to inhibit controlled cognitive processing (De Houwer & Tibboel, 2010; Schimmack, 2005; Verbruggen & De Houwer, 2007; see also Buodo et al., 2002). Contrary to what is commonly believed, these cognitive processes are facilitated by high intensity emotional arousal, regardless of whether such states are positive or negative in valence (see Strack & Deutsch, 2004). Moreover, 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; but see, Brandt, Reyna, Chambers, Carwford, & Wetherell, 2014). Finally, experimental disruption of effortful and controlled 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, seems to encourage several cognitive correlates of conservative thought, individuals who regularly tend to experience emotional arousal in response to the stimuli that they encounter in their environment might be inclined to endorse more conservative political orientation.

An additional mechanism through which we speculate that 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. Conservative ideology often espouses relatively broad limitations of experiences that may prove emotionally or motivationally arousing. For example, premarital and unconventional sex, sexually explicit literature and representation, and recreational drug use are all off-limits (Dombrink, 2006), and these are all highly arousing experiences. Conservatives also 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). Individuals appear to have an optimal level of arousal such that too much arousal is experienced as aversive (see Hebb, 1955; see also Eysenck, 1967; Schmidt et al., 2013; Zuckerman, 1991). Emotionally aroused individuals might be inclined then to select situations and political parties that minimize potential for further arousal. If conservatives have a lower threshold of stimulation compared to liberals, then they might attempt to avoid potential for emotional arousal in their environment. Research has in fact shown that conservatives tend to find arousal uncomfortable (Leone & Chirumbolo, 2008), and to the extent that they are more sensitive, this may help explain conservatives' preference for familiar and simple over abrasive and complex music and art (e.g., Carney, Jost, Gosling, & Potter, 2008) and tendency to migrate to rural (more tranquil) areas, which may be less emotionally arousing than cities (Motyl, Iyer, Oishi, Trawalter, & Nosek, 2014). Indeed, the constellation of personality traits associated with conservative versus liberal orientation such as conscientiousness and reduced openness (see Caprara, Schwartz, Capanna, Vecchione, & Barbaranelli, 2006; Gerber, Huber, Doherty, Dowling, & Ha, 2010; Mondak & Halperin, 2008; Xu, Mar, & Peterson, 2013) may lead individuals to avoid emotionally arousing situations.

Future Directions

We have previously found that emotional arousal may prompt conservative shifts in political orientation (Tritt et al., 2013). Nonetheless, it is also possible that political conservatism leads individuals to experience a lower threshold of neural reactivity. Studies are needed to explore the factors related to personal history, personality traits, and environment, which are correlated with political ideology, and might lead individuals to experience a lower threshold of neural reactivity to stimuli.

Furthermore, the notion that conservatives have a low threshold of reactivity is likely simplistic. For instance, some populations of conservatives in America would seem to exhibit a preference for many arousing stimuli (e.g., firearms, pickup trucks, whiskey, the death penalty) while some populations of liberals prefer seemingly less arousing stimuli (e.g., tea, tai chi, Wes Anderson movies). Future research is needed to examine more of the complexities of the relationship between threshold of arousal, motivational salience, and political orientation, examining the specific types of stimuli that conservatives and liberals find to be subjectively salient. As well, future work should explore whether our results, which only speak to social conservatism, generalize to other types of conservatism.

Future work is also needed to further investigate the relationships between political orientation and self-reported emotional responses versus psychophysiological emotional responsivity. We did not find correspondence between our electrophysiological and self-report results. Political orientation was not correlated with self-report ratings of the valence or the arousal of any stimulus types, with the exception of high arousal positive stimuli, which were rated by conservatives as less positively valenced than

liberals (a trend). Presumably, this might be due to the fact that social conservatism stresses regulation of enjoyment of erotic content (see Kurzban et al., 2010). If conservatives have a relatively low threshold of finding stimuli to be motivationally salient, you would think that they would reportedly find low arousal positive and negative photos to be more arousing and valenced than liberals. However, the subjective experience of emotion is sometimes dissociated from the physiological experience of emotion (e.g., see Izard, 2007). Some studies have found weak correlations between subjective emotional experience and physiological emotional response (e.g., Weinstein, Averill, Opton, & Lazarus, 1968). In fact, research suggests that affective states can occur without conscious subjective experience (e.g., see Winkielman & Berridge, 2004; Zemack-Rugar, Bettman, & Fitzsimons, 2007). Thus, although emotion may be unconscious or at least not verbalizable, it can still be measured implicitly with physiological or behavioral assessments. Self-report and electrophysiology methodologies may detect different types of emotional responses. It is also possible that our lack of correspondence between self-report and electrophysiological data is due to the fact that our self-report data are based on just a subset of stimuli and therefore have less power to detect an effect than the electrophysiological data.

Additional studies should further explore the nature of neurobiological differences, examining a wider array of neurobiological and psychophysiological measures. For instance, studies might examine the correspondence of our ERP findings with those of fMRI findings, which have implicated amygdala volume (Kanai, Feilden, Firth, & Rees, 2011) and activity (Schreiber et al., 2013) in ideological differences

among liberals and conservatives. Future studies, as well, might explore the relationship between political orientation and psychophysiological responses.

Additionally, studies should examine electrophysiological responses to disgust stimuli, in particular, among liberals and conservatives while controlling for arousal intensity. We did not include a specific category of disgusting stimuli in our study. Such inquiry would be useful given the relatively large extent of research that has linked disgust sensitivity to conservatism (e.g., see Inbar et al., 2009). Future work might investigate whether a general reactivity to emotional stimuli underlies the relationship between disgust sensitivity and conservatism.

Finally, future studies should examine whether the results generalize to larger, more diverse non-college student samples. More representative samples are needed to capture the full spectrum of ideology. As well, such future studies should select high and low arousal stimuli based on previous findings about their ability to elicit physiological measures of arousal, whereas our stimuli were chosen based on self-reported standardized arousal ratings. Finally, future studies should examine continuous arousal and valence ratings as predictors of neural responsivity in relation to political ideology, in addition to examining distinct high/low arousal and positive/negative valence categories. Although our study is limited by a small college student sample, in which stimuli were chosen based on standardized self-report arousal and valence category ratings, it provides a good starting point for future investigation.

Conclusion

Previous research has presumed that conservatives experience negative valence information per *se* with heightened motivational salience (e.g., see Hibbing et al., 2014).

However, our study suggests that conservatives experience a wide variety of stimuli in their environment with heightened motivational salience, including positive, neutral, and low-arousal stimuli. What this may suggest is that conservatives have an affective system that is more sensitive to external cues, leading to a reduction in the differentiation of cues. Such a finding has implications for the development and refinement of psychological conceptions of political orientation.

Acknowledgements

We thank Julian Scheffer, Adrian Kamenicka, Simon Beshara, and Mathura Anandarajah for help with data collection. We thank Drs. John Jost, Jay Van Bavel, and Wil Cunningham for helping us to think through our arousal hypothesis. We thank Jennifer Gutsell, Rimma Teper, Alexa Tullett, Xiaowen Xu, Chad Danyluck, Jeffrey Robinson, and Nick Hobson, for their feedback. Grants from the SSHRC, Canada Foundation for Innovation, and Ontario Ministry of Research and Innovation supported this research.

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Notes

[1] The IAPS numbers are as follows. Neutral: 8200 (water-skier), 8130 (high-jumper), 8021 (skier), 7350 (pizza), 7186 (shapes), 7185 (shapes), 7110 (hammer), 7090 (book), 7050 (hair dryer), 7034 (hammer), 7030 (iron), 7002 (towel), 5900 (tumble weeds), 5870 (clouds), 5830 (scenery), 5740 (leaf), 5623 (sail boats), 5510 (mushrooms), 5480 (fireworks), 5201 (trees), 4605 (man and woman), 2840 (boy playing chess), 2600 (man), 2560 (people at picnic), 2480 (man looking out window), 2410 (boy writing on chalk board), 2221 (judge), 2215 (man), 1910 (fish), 1640 (wolf). Low arousal unpleasant: 2095 (a baby with flies on it's face), 2100 (an angry man's face), 2141 (grieving woman/dead man), 2206 (finger prints being drawn), 2399 (a sad woman), 2490 (a sad man), 2700 (despairing women), 2715 (smoking woman), 2722 (man behind bars), 2750 (homeless man drinking), 3015 (dead man laying on road), 4230 (prostitute), 4550 (naked man), 4635 (prostitute), 5130 (ash tray), 5534 (mushrooms), 6010 (man behind bars), 6930 (rockets), 7006 (plate), 7031 (slippers), 7036 (boat), 9010 (barbed wire), 7060 (garbage pail), 7170 (florescent light bulb), 7184 (dirty wall), 7187 (shapes), 9280 (smog), 9290 (garbage), 9331 (homeless man), 9421 (soldier with broken arm). High arousal unpleasant: 1525 (dog barring teeth), 2681 (police officer shining light), 2688 (polar bear being shot), 2730 (boy's face in cow's behind), 2810 (shrieking boy), 2981 (severed deer head), 3010 (bludgeoned bloody head), 3030 (mutilated head), 3060 (mutilated head), 3068 (man shot in head), 3080 (man with burned head), 3100 (man with burned head), 3110 (burned/ mutilated body), 3120 (burned/ mutilated body), 3170 (baby with bloody tumor on eyeball), 3266 (mutilated boy with missing skin over jaw), 3500 (gun assault), 5971 (tornado), 6190 (cocked gun), 6230 (cocked gun), 6250.1 (cocked

gun), 6300 (knife), 6313 (knife assault), 6540 (knife assault), 6550 (knife assault), 6560 (gun assault), 6570 (gun pointed at man's own head), 8485 (exploding car), 9040 (starving man's body), 9252 (man being pulled naked through street). Low arousal pleasant: 1450 (duck), 1620 (deer), 1812 (elephant mother & baby), 1900 (fish in coral reef), 1920 (dolphins playing with ball), 2010 (man smiling), 2040 (smiling baby), 2303 (cheering kids), 2370 (smiling men in suits), 2388 (kids on beach), 2395 (smiling women), 2510 (smiling elderly woman), 2540 (mother and child), 2620 (woman in colorful robes), 2650 (child with ice cream), 4614 (man with flowers), 5001 (flowers), 5200 (flowers), 5760 (colorful scenery), 5779 (flowers on house), 5800 (green leaves), 5811 (lavender tree), 5831 (father with child at ocean), 5891 (clouds in sky), 7039 (train through mountains), 7080 (fork), 7325 (child with watermelon), 7900 (violin), 8330 (woman with trophy), 8497 (women smiling). High arousal pleasant: 1720 (lion), 1811 (monkeys), 2150 (father with baby), 2216 (children playing in water), 4005 (seductive naked woman), 4180 (seductive naked woman), 4220 (woman with nipples exposed), 4232 (woman masturbating under blanket), 4250 (woman swimming naked), 4255 (woman in lingerie), 4310 (naked woman tying shoe), 4460 (naked man), 4532 (man with groceries), 4538 (man in underwear), 4534 (man with shirt off), 4572 (shirtless firefighter), 4598 (soldier hugging wife), 4599 (man and woman hugging), 4607 (man and woman lying in park), 4608 (man and woman hugging), 4664.1 (man hugging naked woman), 4680 (naked man and woman), 5629 (mountain climber), 7502 (Disney land), 8030 (skier), 8185 (men skydiving), 8186 (skydiver), 8190 (skiers), 8400 (white water rafting), 8501 (money).

[2] 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 picture-viewing paradigm. 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), $F(43)=.45$, $p=.508$, $\eta^2=.01$. This suggests that the experimental manipulation did not successfully alter SDO. We also conducted analyses to see if this manipulation affected EPN or LPP amplitudes in response to any stimulus types. In these analyses, we modeled EPN and LPP amplitudes 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. Political conservatism did not significantly interact with the pre/post manipulation variable to predict LPP amplitudes, $b=-.18$, $SE=.24$, $F(1,326.68)=.56$, $p=.455$, $R^2<.01$. Conservatism also did not interact with valence and the pre/post manipulation variable ($b=.21$, $SE=.25$, $F(1,318.90)=.73$, $p=.393$, $R^2<.01$) or with arousal and the pre/post variable, $b=-.23$, $SE=.23$, $F(1, 318.90)=1.06$, $p=.304$, $R^2<.01$, nor was there a 4-way interaction between arousal, valence, conservatism, and the pre/post variable, $b=.27$, $SE=.25$, $F(1, 318.90)=1.16$, $p=.283$, $R^2<.01$. Political conservatism

significantly interacted with the pre/post manipulation variable to predict EPN amplitudes, b=-.39, SE=.19, $F(1,323.24)$=4.40, p=.037, R^2=.01. Specifically, conservatism was associated with a more negative deflection of the EPN when assessed post-manipulation, b=-2.21, SE=1.01, $F(1,43.65)$=4.81, p=.034, R^2=.10, but not pre-manipulation b=-1.48, SE=1.00, $F(1,42.57)$=2.19, p=.147, R^2=.05. However, conservatism did not interact with valence and the pre/post manipulation variable (b=.17, SE=.19, $F(1,319.06)$=.77, p=.381, R^2<.01) nor with arousal and the pre/post variable, b=-.22, SE=.17, $F(1,319.06)$=1.66, p=.198, R^2<.01, nor was there a 4-way interaction between arousal, valence, conservatism, and the pre/post variable, b=.01, SE=.19, $F(1,319.06)$=.001, p=.992, R^2<.01. Because the relationship between conservatism and the EPN/LPP was not majorly 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 EPN/LPP were pre or post manipulation. Including the EPN/LPP amplitudes post-manipulation had the benefit of a complete analysis and an increase in statistical power.

As well, we note that we focused on social conservatism, and not SDO because previous research has suggested that defensive emotional/psychological motivates promote specifically social conservatism and not necessarily other types of conservative thought (e.g., see Malka et al., 2014). Nonetheless, in the name of transparency, the results of our main analysis with SDO are as follows. Predicting the LPP, a main effect of SDO was not found, b=.15, SE=.99, $F(1,39.87)$=.02, p=.877, R^2<.01, nor was there a significant interaction between SDO and arousal in predicting LPP amplitudes (b=.15, SE=.24, $F(1,322.87)$=.40, p=.396, R^2<.01) or between SDO and valence in predicting

LPP amplitudes, b=-.11, SE=.26, $F(1,322.81)$=.18, p=.184, R^2<.01. There was however a significant 3-way interaction between SDO, valence, and arousal in predicting LPP amplitudes, b=.61, SE=.26, $F(1,322.81)$=5.63, p=.018, R^2=.02. Follow-up simple effects tests revealed that participants high in SDO exhibited significantly greater LPP amplitudes in response to positive versus negative high arousal stimuli, b=1.03, SE=.46, $F(1,322.78)$=5.00, p=.026, R^2=.02. However, there was no effect of valence among participants high in SDO in response to low arousal stimuli, b=-.69, SE=.46, $F(1,322.78)$=2.25, p=.135, R^2<.01, nor was there a simple effect of valence among participants low in SDO when stimuli were high in arousal (b=.21, SE=.47, $F(1,322.78)$=.20, p=.652, R^2<.01) or low in arousal, b=.49, SE=.47, $F(1,322.78)$=1.11, p=.293, R^2<.01, predicting LPP amplitudes. Predicting the EPN, a main effect of SDO was not found, b=-.09, SE=1.07, $F(1,39.98)$=.01, p=.930, R^2<.01, nor was there a significant interaction between SDO and arousal in predicting EPN amplitudes (b=-.04, SE=.18, $F(1,322.97)$=.05, p=.832, R^2<.01). Nor was there a significant 3-way interaction between SDO, valence, and arousal in predicting EPN amplitudes, b=.03, SE=.19, $F(1,322.94)$=.03, p=.869, R^2<.01. There was a trend of an interaction between SDO and valence in predicting EPN amplitudes, b=-.33, SE=.19, $F(1,322.94)$=2.96, p=.087, R^2=.01, such that valence had a significant impact on the EPN (a more negative deflection for positive versus negative stimuli) among participants high in SDO, b=-.57, SE=.22, $F(1,322.94)$=6.50, p=.011, R^2=.02, but not low in SDO, b=-.02, SE=.23, $F(1,322.94)$=.01, p=.914, R^2<.01.

[3] Tanner, Morgan-Short, and Luck (2015) recently reviewed the effect of high-pass filters upon the amplitude of slow ERP components and made recommendations about the

optimal filter settings, which maximize statistical power and minimize filtering artifacts. Tanner and colleagues concluded that .1 Hz is the ideal high-pass filter setting for slow, positive ERPs such as the LPP. We accordingly employed a .1 filter.

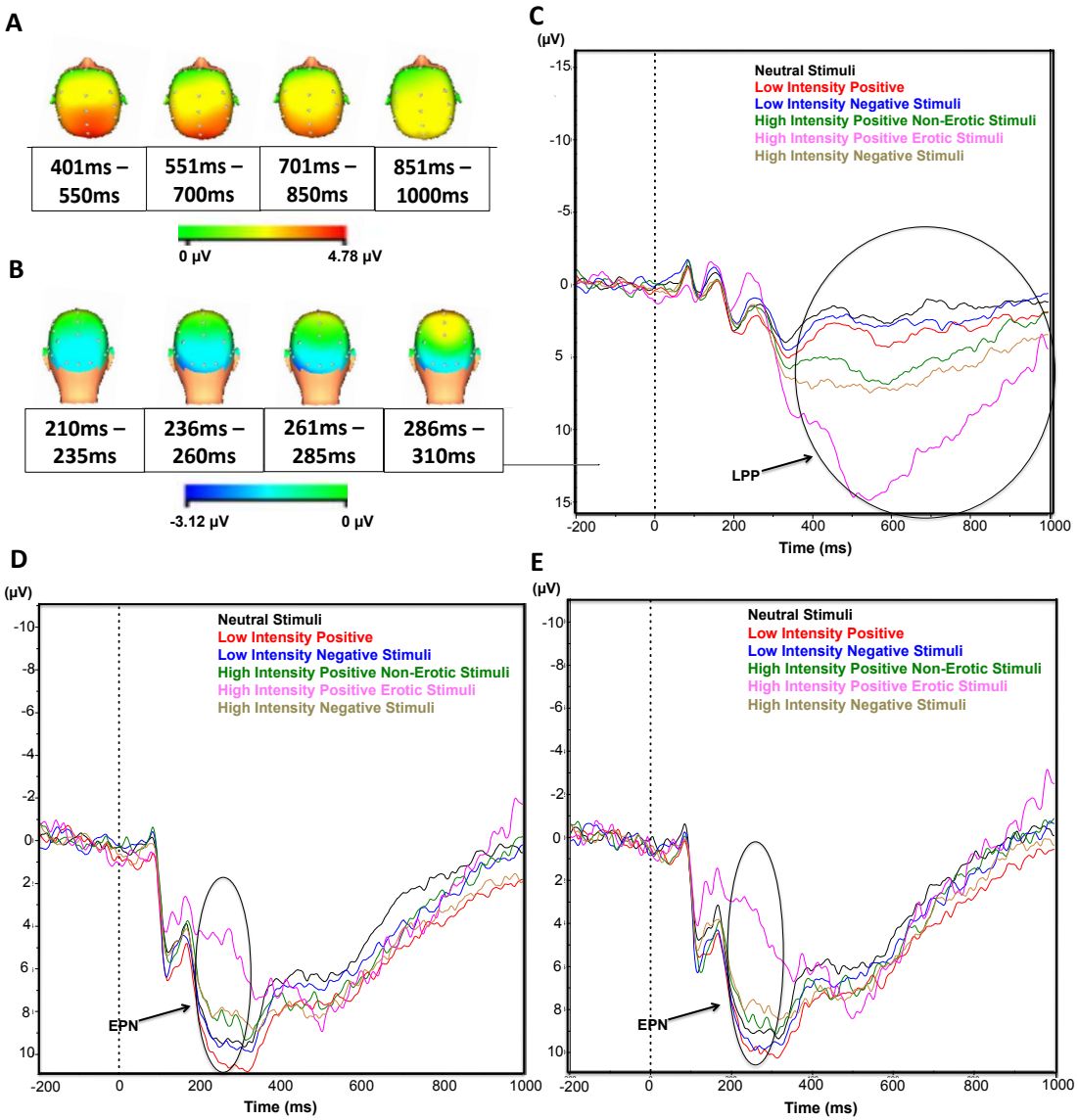
[4] Given that some others have operationalized the LPP as the average activity at centro-parietal and parietal electrode sites (e.g., Hajcak, Dunning, & Foti, 2009), we re-analyzed our results with the LPP operationalized as the average activity across electrode sites CPz and Pz. The significance of each of our findings remained unchanged when the LPP was averaged across these electrode sites.

Figure Captions

Figure 1. Figure A depicts topographical maps that demonstrate the difference score in electroencephalographic activity when looking at high versus low arousal stimuli in the time window of the late positive potential (LPP), 400-1000 ms post stimuli exposure. Figure B depicts topographical maps that demonstrate the difference score in electroencephalographic activity when looking at high versus low arousal stimuli in the time window of the Early Posterior Negativity (EPN), 210-310 ms post stimuli exposure. Figure C illustrates the LPP waveforms at electrode Pz in response to stimuli that differ in terms of valence and arousal. Figure D illustrates the EPN waveforms at electrode O1 in response to stimuli that differ in terms of valence and arousal Figure E illustrates the EPN waveforms at electrode O2 in response to stimuli that differ in terms of valence and arousal

Figure 2. Figure A depicts a scatterplot diagram of the relationship between scores on the social conservatism scale (SCS; Henningham, 1995; Wilson & Patterson, 1968) and the LPP (400-1000 ms post stimulus exposure at electrode pz) in response to high arousal positive and negative stimuli. Figure B depicts a scatterplot diagram of the relationship between scores on the SCS and the LPP (400-1000 ms post stimulus exposure at electrode pz) in response to low arousal positive and negative stimuli. Figure C depicts a scatterplot diagram of the relationship between scores on the SCS and the EPN (210-310 ms post stimulus exposure averaged across electrodes, O1 and O2) in response to high arousal positive and negative stimuli. Figure D depicts a scatterplot diagram of the

relationship between scores on the SCS and the EPN (210-310 ms post stimulus exposure averaged across electrodes, O1 and O2) in response to low arousal positive and negative stimuli. * = $p < .1$; ** = $p < .05$.


A
401ms – 550ms
551ms – 700ms
701ms – 850ms
851ms – 1000ms
0 μV
4.78 μV
B
210ms – 235ms
236ms – 260ms
261ms – 285ms
286ms – 310ms
-3.12 μV
0 μV
C
(μV)
Neutral Stimuli
Low Intensity Positive
Low Intensity Negative Stimuli
High Intensity Positive Non-Erotic Stimuli
High Intensity Positive Erotic Stimuli
High Intensity Negative Stimuli
LPP
Time (ms)
D
(μV)
EPN
Time (ms)
E
(μV)
EPN
Time (ms)

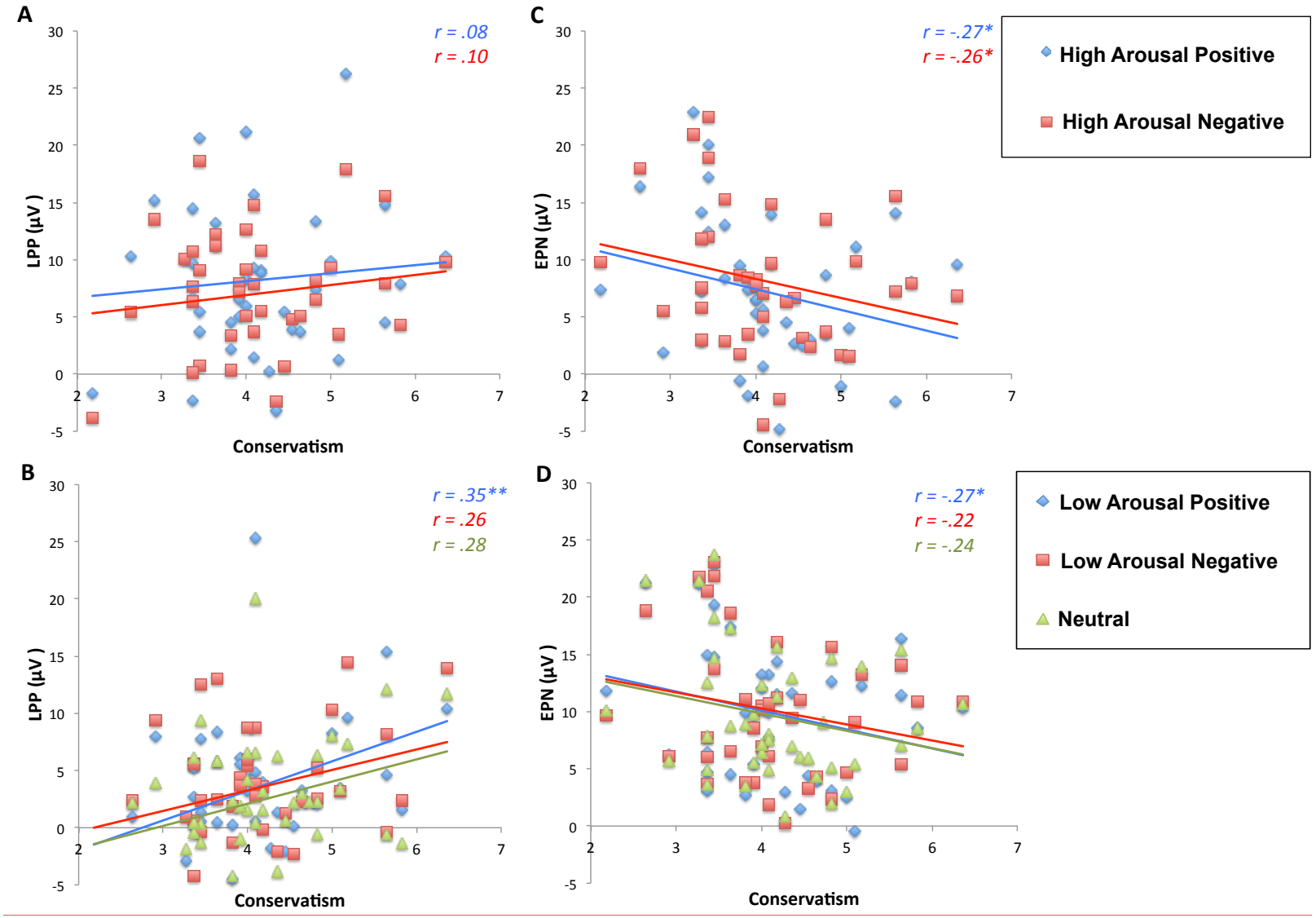

A
r = .08
r = .10
LPP (μV)
Conservatism
C
r = -.27*
r = -.26*
EPN (μV)
Conservatism
High Arousal Positive
High Arousal Negative
B
r = .35**
r = .26
r = .28
LPP (μV)
Conservatism
D
r = -.27*
r = -.22
r = -.24
EPN (μV)
Conservatism
Low Arousal Positive
Low Arousal Negative
Neutral

Table 1

The first two rows indicate the standardized arousal and valance ratings of the IAPS images used in our study reported by Lang and colleagues (1997). The 3rd and 4th rows report ratings of arousal and valence by participants in our own study (N=42) about a subset of 5 images from each category. For all ratings, high scores reflect more positive versus negative valence and more arousing versus less arousing content. The 5th row reports the mean values of the LPP amplitudes (μv), evidenced 400-1000 ms post stimulus exposure at electrode, Pz during our experiment in response to each stimulus type, whereas the 6th row reports the mean values of the EPN amplitudes (μv), evidenced 210-310 ms post stimulus exposure at electrodes O1 and O2, during our experiment in response to each stimulus type. The 7th and 8th rows report the 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. The 9th row reports correlations between the LPP and scores on the SCS. The 10th row reports correlations between the EPN and scores on the SCS.

	High arousal pleasant IAPS (only erotic content; 12 images)	**High arousal pleasant IAPS (No erotic content included; 18 images)**	**High arousal unpleasant IAPS (30 images)**	**Low arousal pleasant IAPS (30 images)**	**Low arousal unpleasant IAPS (30 images)**	**Neutral IAPS (30 images)**
Standardized valence ratings	6.35 (.80) $_a$	7.12 (.67)$_b$	2.35 (.75)$_c$	7.01(.65)$_b$	3.76 (1.03)$_d$	5.79 (1.09)$_a$
Standardized arousal ratings	5.80 (.79)$_a$	5.78 (.96)$_a$	6.55 (.65)$_b$	3.63 (.72)$_c$	3.96 (.97)$_c$	3.80 (1.16)$_c$

Participant valence ratings	4.58 (3.04)$_a$	7.40 (1.28)$_b$	2.80 (1.03)$_c$	7.96 (1.56)$_d$	3.10 (1.02)$_c$	6.38 (1.46)$_e$
Participant arousal ratings	5.62 (2.13)$_a$	6.02 (1.54)$_a$	7.09 (1.56)$_b$	3.61 (1.79)$_c$	6.40 (1.40)$_d$	3.94 (1.24)$_c$
LPP mean amplitude (μv)	10.70 (7.74)$_a$	10.70 (7.74)$_a$	10.70 (7.74)$_a$	10.70 (7.74)$_a$	10.70 (7.74)$_a$	10.70 (7.74)$_a$
EPN mean amplitude (μv)	5.35 (6.65)$_c$	9.05 (6.50)$_b$	8.16 (5.97$_b$	9.95 (6.29)$_a$	10.06 (5.91)$_a$	9.93 (5.89)$_a$
Correlation between the SCS and valence ratings	-.26*$_a$	-.14$_a$	.04$_a$	-.08$_a$	-.16$_a$	.13$_a$
Correlation between the SCS and arousal ratings	-.02$_a$	.22$_a$	-.01$_a$	.05$_a$	.03$_a$	.21$_a$
Correlation between the SCS and the LPP (μv) for each stimulus type	.07$_a$	.08$_a$	.10$_a$	.35**$_a$	.26$_a$	.28*$_a$
Correlation between the SCS and the EPN (μv) for each stimulus type	-.20$_a$	-.33** $_a$	-.29* $_a$	-.29* $_a$	-.23* $_a$	-.26* $_a$

Note. IAPS=International affective picture system; Early posterior negativity; LPP=Late positive potential; *=trend $p<.1$; **=significant $p<.05$; ***=significant $p<.01$. Different subscripts within a row denote significantly different values assessed with t-tests, $p<.05$.