How Does Motivation Modulate the Operation of the Mentalizing Network in Person Evaluation?

Tehila Nugiel and Jennifer S. Beer

Abstract

The mentalizing network is theorized to play a central role in making sense of people (compared with nonsocial targets), but is its involvement affected when we make sense of people in a non-dispassionate manner (e.g., favoritism toward others on the basis of group membership)? First, mixed findings and small samples have prevented strong conclusions about whether intergroup evaluation increases or decreases activation regions associated with the mentalizing network. Second, little is known about the psychological mechanism underlying mentalizing network activation shaped by ingroup versus outgroup evaluations. Psychological models suggest two hypotheses that can be challenging to disentangle with self-report: Ingroup trait evaluations may benefit from a priori expectations and/or preferential evidence accumulation. Therefore, the current study ($n = 50$) drew on a combination of drift diffusion modeling and fMRI to examine how group membership affects the engagement of the mentalizing network for trait evaluation and whether group-differentiated activation is associated with a priori expectations and/or preferential evidence accumulation. Outgroup trait evaluations engaged dorsomedial pFC activation, whereas ingroup trait evaluations engaged ventromedial pFC activation as well as other regions associated with mentalizing such as precuneus, posterior cingulate cortex, and right TPJ. Furthermore, the ventromedial pFC and posterior cingulate cortex activation was associated with differential expectations applied to ingroup trait evaluation. The current findings demonstrate the importance of combining motivational factors, computational modeling, and fMRI to deepen our understanding of the neural basis of person evaluation.

INTRODUCTION

A collection of neural regions, often referred to as the mentalizing network, have been robustly associated with person evaluation (compared with nonsocial targets and sometimes called the “theory of mind network”; Quadflieg & Koldewyn, 2017; Molenberghs, Johnson, Henry, & Mattingley, 2016; Schurz, Radua, Aichhorn, Richlan, & Perner, 2014; Saxe, 2006), but it has been less clear whether these regions are modulated by psychological factors known to influence person evaluation such as the preferential evaluation of ingroup compared with outgroup members (e.g., Pew Research Center, 2016; Duarte et al., 2015; Brandt, Reyna, Chambers, Crawford, & Wetherell, 2014; Bartels, 2002; Munro et al., 2002). Some researchers have raised the possibility that the mentalizing network should be more strongly recruited for the evaluation of ingroup members (Molenberghs & Louis, 2018; Freeman, Schiller, Rule, & Ambady, 2010; Harris & Fiske, 2007) whereas others have argued that there should be important exceptions to this hypothesis (i.e., dorsomedial pFC [dMPFC] activation may be increased for the personal qualities of outgroup members; Mitchell, Macrae, & Banaji, 2006). Extant research has prevented strong conclusions for several reasons. First, initial studies tend to examine evaluations of unknown ingroup and outgroup members, which may differ from the psychological and neural processes brought to bear on the evaluation of familiar individuals (e.g., Hewstone, Rubin, & Willis, 2002; Phelps et al., 2000). Second, much of the existing research has utilized small samples even when conducting individual difference analyses (e.g., 20 people or less). Finally, existing studies have relied on self-report, which makes it challenging to understand the underlying psychological mechanism associated with the neural activation observed in relation to ingroup versus outgroup evaluation. Therefore, the operation of the regions associated with the mentalizing network in intergroup evaluation will benefit from new research, which extends evaluations to familiar ingroup and outgroup members, draws on larger samples, and uses a new methodological approach to address self-report problems.

Although previous research has laid a clear foundation of neural regions, which are expected to underlie the evaluation of a person’s internal qualities (i.e., ventral and dorsal medial pFC, TPJ, precuneus/poster cingulate cortex, and STS; e.g., Molenberghs & Louis, 2018; Quadflieg & Koldewyn, 2017; Molenberghs et al., 2016; Schurz et al., 2014; Van Bavel, Packer, & Cunningham, 2008, 2011; Freeman et al., 2010; Tamir & Mitchell, 2010; Ito & Bartholow, 2009; Harris & Fiske, 2007), it has not yet fully bridged extant findings with psychological models of
person perception. For example, national surveys and scientific research indicate that one fundamental aspect of person evaluation is the tendency to differentially evaluate the internal attributes of people as a function of whether they share a group membership, such as political affiliation, with the perceiver (e.g., shared vs. nonshared group membership; Pew Research Center, 2016; Duarte et al., 2015; Brandt et al., 2014; Bartels, 2002; Munro et al., 2002). Previous research has interpreted the differential evaluations across groups to reflect a motivation to paint ingroup members in a flattering light (Fiske & Taylor, 2017; Hewstone et al., 2002; Kunda, 1990). In other words, it is not a coincidence that people tend to rate their ingroup members in a more flattering light, they ensure that evaluation either by imposing an a priori expectation or preferential rate of evidence accumulation (i.e., Hewstone et al., 2002). However, people are unlikely to have insight into whether expectations and/or evidence accumulation processes have shaped their person evaluation (e.g., Nisbett & Wilson, 1977). Additionally, RT is not helpful for disentangling the influence of expectations from differential evidence accumulation as both may facilitate responses. Therefore, understanding neural activation in relation to the expectations and evidence accumulation processes that account for group membership effects on person evaluation will require an approach other than simple self-report or RT such as drift diffusion modeling (DDM; Ratcliff, 1978).

Furthermore, psychological models of group effects on person evaluation highlight the importance of studying group membership effects on person evaluation for familiar individuals to build on previous research on group effects on novel person evaluation (Molenberghs & Louis, 2018; Van Bavel et al., 2008, 2011; Freeman et al., 2010; Tamir & Mitchell, 2010; Ito & Bartholow, 2009; Beer et al., 2008; Harris & Fiske, 2007). When someone must evaluate a novel individual on the basis of a group label or a photograph, their evaluation process is limited because they have no actual knowledge of the person. However, when an evaluation target is a familiar person (such as a political figure), people have the possibility of sorting through evidence from previous knowledge about the specific target when evaluating their internal qualities in addition to drawing on expectations based on group membership. Therefore, research on the evaluation of familiar individuals affords the opportunity to understand motivated evaluation above and beyond evaluations of novel individuals.

The current study addressed three questions about the operation of regions associated with the mentalizing network in ingroup versus outgroup trait evaluation. Participants were prescreened for political group affiliation (i.e., Democratic Party in the United States) and asked to evaluate whether well-known politicians from their political ingroup and a political outgroup (i.e., Republican Party in the United States) possessed particular personality traits. To ameliorate issues associated with self-report, DDM was applied to participants’ responses to assess differences in a priori expectations and evidence accumulation processes when evaluating the traits of ingroup versus outgroup politicians. The study tested whether the MPFC showed differential engagement based on group affiliation as previously suggested (e.g., Mitchell et al., 2006; but see Molenberghs & Louis, 2018; Freeman et al., 2010; Harris & Fiske, 2007), that is, whether ventromedial pFC (vMPFC) activation increased in relation to ingroup evaluations whereas dMPFC activation increased in relation to outgroup evaluations (Hypothesis 1A–B). Second, the study tested whether other regions associated with the mentalizing network showed increased activation in relation to ingroup evaluations (Hypothesis 2). Finally, the study examined whether activation in regions associated with ingroup evaluations was predicted by differences in a priori expectations (i.e., starting point parameter) and/or evidence accumulation rate (i.e., drift rate parameter; Hypotheses 3A and 3B).

**METHODS**

**Participants**

Analysis was conducted for 50 participants (36 women, $M_{age} = 22.18$ years, $SD = 4.70$ years). Additionally, one participant was excluded because of a permanent retainer, two participants were excluded because of an excessive number of missed responses (i.e., greater than 25%), and one run from one participant was excluded because of excessive head motion (i.e., $> 3$ mm). Participants were prescreened for Democratic political party affiliation, right-handedness, and to eliminate history of psychological or neurological issues. Participants received monetary compensation for their time ($15/hr). All participants gave informed consent in compliance with the human subject regulations of the University of Texas at Austin.

**Procedure**

Participants evaluated the personality traits of well-known politicians using modified procedures from previous research on trait evaluation (e.g., Rigney, Koski, & Beer, 2018; Ochsner et al., 2005; Anderson, 1968). In each trial, participants saw a picture of a politician, the politician’s political party affiliation, and a prompt to rate if each politician possessed a trait (Figure 1). Participants used a 2-point scale (yes, no) to rate all six politicians on each of 60 trait words. There were 30 positive trait words and 30 negative words. Trait words were taken from a list of words standardized for valence (Anderson, 1968) and have been used with a modified version of this task in previous research, which addressed a different research question in an independent sample of participants (Rigney et al., 2018). There were three politicians from the Democratic party and three politicians from the
Republican party. Politicians were matched for age and sex across party to control for visual and social features of the stimuli. Democratic politicians consisted of Barack Obama, Bernie Sanders, and Wendy Davis. Republican politicians consisted of Donald Trump, Ted Cruz, and Sarah Palin.

fMRI data were collected while participants performed five functional runs that each included 18 blocks (12 experimental blocks, 6 baseline blocks). Each experimental block consisted of six 3-sec trials (18 sec) and focused on one politician and one word valence (e.g., Block 1 might be positive traits paired with Barack Obama; Block 2 might be negative traits paired with Donald Trump) with every combination of valence and politician being represented within a given run. Blocks were presented randomly across participants with the caveat that blocks from the same condition were never consecutively presented. Each baseline block (18 sec) consisted of a fixation cross. Experimental blocks were also followed by a 9-sec interblock interval, which depicted a fixation cross to ensure that participants finished thinking about the previous block and cleared their minds before beginning a new block.

Before entering the scanner, participants completed 24 practice trials that were identical to the scanner task, with the exception that they were asked to rate different politicians. The practice trials ensured that participants understood how to complete the task before beginning the experiment. After exiting the scanner, participants answered four questions about their political values. Specifically, participants used a 7-point scale (1 = not at all, 4 = somewhat, 7 = very) to rate the extent to which they see themselves as liberal, conservative, and politically engaged. They also rated the likelihood (0–100%) that they would vote in the upcoming election.

**MRI Data Acquisition**
All images were collected on a 3-T Siemens Skyra scanner at the University of Texas at Austin Imaging Research Center. Functional images were acquired with an EPI sequence with a multiband factor of 2 (time repetition = 1500 msec, time echo = 30 msec, field of view = 230 mm, voxel size = 3 mm × 3 mm × 3 mm, flip angle = 71°), with each volume consisting of 50 axial slices. Higher order shimming was used to reduce susceptibility artifacts. A high-resolution full-brain image using a magnetization-prepared rapid gradient-echo pulse sequence (repetition time = 1900 msec, inversion time = 900 msec, echo time = 2.43 msec, flip angle = 9°, field of view = 256) was acquired for image registration.

**Politician Personality Rating Analysis**
Participants’ personality ratings were analyzed in a 2 (Valence: positive and negative) × 2 (Politician: Democrat and Republican) within-subject ANOVA to test whether participants showed behavioral evidence that they were more likely to affirm the positive traits of Democrats (i.e., their in-group political party) and more likely to affirm the negative traits of Republicans (i.e., the opposing political party).

**Univariate Preprocessing and Analysis**
Preprocessing and statistical analyses were conducted using the FSL software toolbox (Oxford Center for...
Functional Magnetic Resonance Imaging [FMRIB]; Smith et al., 2004). Functional image volumes were motion-corrected using MCFLIRT (Jenkinson, Bannister, Brady, & Smith, 2002) using an 8-mm search and trilinear interpolation to transform the middle volume to the adjacent one and then next adjacent and so forth. Nonbrain structures were stripped from functional and structural volumes using the Brain Extraction Tool (Smith, 2002). Functional and structural data were normalized and linearly registered into MNI-152 standard anatomical space (2 mm isotropic voxels) using FSL’s Linear Image Registration Tool and a T1 template (Montreal Neurological Institute). Images were smoothed with 8-mm FWHM Gaussian kernel. A high-pass filter with a cutoff period of 90 sec was applied to remove within-session drifts, and a field map was used to correct EPI data to reduce spatial distortions.

A fixed-effects analysis modeled (a) positive valence and Democrat politician, positive valence and Republican politician, negative valence and Democrat politician, negative valence and Republican politician blocks using a canonical block hemodynamic response function and (b) the inter-block intervals as a regressor of no interest. Contrasts from each run of each participant were used in a second-level block intervals as a regressor of no interest. Contrasts from each run of each participant were used in a second-level analysis treating runs as a fixed effect. FEAT’s FLAME module (FMRIB’s Local Analysis of Mixed Effects; Smith et al., 2004) was used to conduct a three-level analysis treating participants as a random effect. Whole-brain group maps were cluster-corrected (cluster threshold of $z > 2.3, p < .05$). A general linear model tested the Group (ingroup, outgroup) × Valence (positive, negative) factorial design; our hypothesized analyses focused on identifying the operation of mentalizing network regions for comparisons of ingroup (Democrat) versus outgroup (Republican) with the contrasts Ingroup > Outgroup and Outgroup > Ingroup (Hypotheses 1A, 1B, and 2). A follow-up analysis was conducted to test whether the hypothesized regions (i.e., those associated with the mentalizing network) identified as parts of large clusters in the main contrast survived at a stricter correction (cluster threshold of $z > 3.1, p < .05$).

**DDM Analysis**

Fast-dm was used to conduct diffusion model data analysis (Voss & Voss, 2007). DDM is a variant of continuous sampling models proposed for two-alternative forced-choice decisions (Ratcliff, 1978). Recent applications of the DDM procedure have been conducted for decisions that reflect subjective preferences that cannot be reduced to correct or incorrect choices (Flagan, Mumford, & Beer, 2017; Krajbich, Lu, Camerer, & Rangel, 2012; Milosavljevic, Malmaud, Huth, Koch, & Rangel, 2010). DDM is fit to the response and RT data.

In DDM, the model assumes that decisions between options entail the continuous sampling of information over time beginning from an initial value called the starting point ($z$); sampling continues until a decision boundary is reached ($a$ or 0) and a decision response is initiated. The relation of the starting point to the upper threshold ($z/a$) reflects the expectations that precede the decision process. For example, if $z$ is closer to the upper threshold $a$, this suggests a prior expectation of outcome $a$, whereas if $z$ is closer to the lower threshold 0, this suggests a prior expectation of outcome 0. Additionally, the rate at which information is accumulated toward a decision is measured by the drift rate ($v$), which reflects the strength of decision evidence. Faster drift rates indicate facilitated processing of the information needed to reach a decision. The difference in nondecisional time parameter ($d$) captures the mean difference in nondecisional time for responses corresponding to the upper threshold and the lower threshold. Finally, DDM estimates four other parameters: a parameter for nondecision processes ($t_0$) and three parameters that index trial variability (variability in starting point, $sz$; variability in drift rate, $sv$; and variability in nondecisional components $st$; Ratcliff, 1978).

The current study focused on starting point and drift rate. Starting point and drift rate have dissociable effects in terms of the RT distribution’s shift and skew as well as choice probabilities (White & Poldrack, 2014). For example, simulations and empirical investigations have shown that starting point bias leads to a shift in the leading edge of the RT distribution (e.g., the fastest responses as assessed by the 0.2 quantile) whereas drift rate bias does not. Instead, drift rate biases are more likely to affect the skew of the RT distribution (i.e., both fast and slow responses; White & Poldrack, 2014).

To investigate whether theorized neural regions were associated with differential starting points and rates of evidence accumulation for ingroup versus outgroup evaluation, a DDM was fit to the response and RT data and the eight parameters mentioned above were estimated. The upper threshold ($a$) corresponds to the rejection of a trait as descriptive for the politician (no), and the lower threshold ($0$) corresponds to the attribution of the trait as descriptive for the politician (yes). Based on the main effect results in the neural map, the starting point ($z$), drift rate ($v$), and difference in nondecisional time ($d$) were estimated for the group conditions (ingroup, outgroup), holding all other model parameters ($a$, $t_0$, $sz$, $sv$, $st$) constant (Voss & Voss, 2007; Voss, Rothermund, & Voss, 2004).

The starting point, relative to the upper threshold ($a$), captured preexisting expectations of personality evaluations by estimating how much the starting point favored one decision (i.e., yes) over the other (i.e., no) for ingroup and outgroup politicians. In other words, the starting point for each group condition reflects the extent to which participants began their evaluation with a particular response in mind as a function of the group category. Note that starting point is calculated from RTs and responses across trials and does not reflect behavior from just the initial trials. The drift rate captured sensitivity to information about a politician by estimating the rate at
which information is accumulated toward a decision threshold in each condition. In other words, the drift rate represents how quickly each participant accumulates the amount of evidence that makes each participant feel ready to choose a response option for each group condition. Drift rate does not reflect differences in the amount of evidence but rather how quickly each person can reach their idiosyncratic standard of feeling they have enough evidence to choose a response. The difference in nondecisional time \((d)\) captures the mean difference in nondecisional time for responses corresponding to the upper threshold (i.e., no) and the lower threshold (i.e., yes). Model fit was assessed using the Kolmogorov–Smirnov (KS) statistic, which is robust against outliers and uses the entire empirical distributions of RTs (Voss & Voss, 2007; Voss et al., 2004). For each model, we computed the mean probability value of the KS statistic when comparing the empirical distribution to the predicted distribution. Small probability values (e.g., \(p < .05\)) for the KS statistic indicate significant deviations between the empirical and predicted distributions and the four subjects who did not exceed these probability values were not included in subsequent analyses.

The planned analyses tested whether differential starting points and drift rates between ingroup and outgroup evaluations predicted neural activation from the main contrast (Hypotheses 3A and 3B). Therefore, differences in starting points and drift rates were regressed on the ingroup versus outgroup contrast as a third-level correlate using FLAME Stage 1 \((z > 2.3, p < .05)\). For the differences in drift rate model, one participant had an outlier value (> 3.5 SDs over the mean) and was not included in further analyses. Each regression model included the other DDM parameter as a covariate of no interest (e.g., models testing discrepancy in starting point controlling for drift rate). The focus of interpretation was on the brain–behavior relation, that is, the parameter estimates and neural activity were extracted from voxels, which were identified in the regression analyses and in the main contrast. A follow-up analyses was conducted to test whether the brain–behavior relation, that is, the parameter estimates of neural activity survived a stricter correction \((z > 3.1)\).

**RESULTS**

**Prescreening Check: Participants Exhibited Affiliation with the U.S. Democratic Political Party**

Self-reports from the day of the fMRI study were consistent with the prescreening for political party affiliation. Participants rated themselves as significantly more liberal than conservative in their political views, \(t(49) = 15.35, p < .001, d = 4.39\), significantly more liberal than the centerpoint of the 7-point scale \((M = 5.96, SD = 0.95)\), \(t(49) = 18.37, p < .001, d = 5.25\), and significantly less conservative than the centerpoint of the 7-point scale \((M = 2.18, SD = 1.06)\), \(t(49) = -8.78, p < .001, d = -2.51\). Additionally, participants rated themselves as significantly more politically engaged than the centerpoint of the 7-point scale \((M = 4.52, SD = 1.34)\), \(t(49) = 5.37, p < .001, d = 1.53\), and more likely to vote than chance levels in the upcoming election \((M = 82.96\%, SD = 31.06\%)\), \(t(48) = 7.42, p < .001, d = 2.14\).

**Participants Gave More Flattering Trait Evaluations to Ingroup Politicians than Outgroup Politicians**

As in previous research (Rigney et al., 2018; Pew Research Center, 2016; Duarte et al., 2015; Brandt et al., 2014; Bartels, 2002; Munro et al., 2002), trait ratings were more favorable for the ingroup (Democratic politicians; see Figure 2). There was a significant main effect of valence, \(F(1, 49) = 55.25, p < .001\), and a significant interaction between politician and valence, \(F(1, 49) = 316.68, p < .001\). There was not a significant main effect of political party, \(F(1, 49) = 0.13, p = .719\). Participants were significantly more likely to rate Democratic politicians as having positive traits than Republican politicians (Democrat: \(M = 0.92, SD = 0.13\); Republican: \(M = 0.24, SD = 0.17\)), \(t(49) = 18.40, p < .001, d = 5.26\). Similarly, they were significantly more likely to rate Republicans as having negative traits than Democratic politicians (Republican: \(M = 0.75, SD = 0.2\); Democrat: \(M = 0.06, SD = 0.14\)), \(t(49) = 16.62, p < .001, d = 4.75\). Positive traits were endorsed more than negative traits (positive, \(M = 0.58, SD = 0.08\); negative, \(M = 0.41, SD = 0.10\)), \(t(49) = 7.45, p < .001, d = 2.12\).

Both starting point and drift rate significantly differed across group conditions. Participants tended to expect to respond with a positive response ("yes") for ingroup evaluations compared with outgroup trait evaluations (starting point: Democrat: \(M = 0.44, SD = 0.09\); Republican: \(M = 0.49, SD = 0.08\)), \(t(45) = 2.53, p < .05\). Participants tended to have a faster rate of accumulating the evidence they felt...
they needed to choose a response for outgroup trait evaluations (drift rate: Democrat: $M = 1.10$, $SD = 0.48$, Republican: $M = 1.3$, $SD = 0.50$), $t(45) = -4.79$, $p < .05$.

**Hypotheses 1A and 1B: Ingroup Evaluation Associated with vMPFC Activation; Outgroup Evaluation was Associated dMPFC Activation**

As hypothesized, the ingroup evaluation condition (Ingroup > Outgroup contrast) was associated with activation in the vMPFC while outgroup evaluation (Outgroup > Ingroup) was associated with activity in the dMPFC (Figure 2; Table 1).

**Hypothesis 2: Ingroup Evaluation Was Related to Activity in Regions Associated with the Mentalizing Network beyond the MPFC**

As hypothesized, ingroup evaluation (Ingroup > Outgroup contrast) was also related to activation in other regions typically associated with person evaluation such as the superior temporal gyrus, the precuneus, the right TPJ,

<table>
<thead>
<tr>
<th>Table 1. Main Effects of Group on Neural Activation</th>
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<tbody>
<tr>
<td><strong>Contrast</strong></td>
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<tr>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Ingroup &gt; Outgroup</td>
</tr>
<tr>
<td>L lateral occipital cortex</td>
</tr>
<tr>
<td>L intracalcarine cortex</td>
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<tr>
<td>Ventral medial prefrontal cortex&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Precuneus&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>R lateral occipital cortex/</td>
</tr>
<tr>
<td>temporoparietal junction&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>R supramarginal gyrus</td>
</tr>
<tr>
<td>R precentral gyrus</td>
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<tr>
<td>R middle temporal gyrus</td>
</tr>
<tr>
<td>R hippocampus</td>
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<tr>
<td>Outgroup &gt; Ingroup</td>
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<tr>
<td>L postcentral gyrus</td>
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<tr>
<td>L superior parietal lobe</td>
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<tr>
<td>L cerebellium</td>
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<tr>
<td>L lateral occipital cortex</td>
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<tr>
<td>R cerebellium</td>
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<tr>
<td>L orbital frontal cortex</td>
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<td>L inferior frontal gyrus</td>
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<tr>
<td>Dorsal medial prefrontal cortex&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>L caudate</td>
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<td>L thalamus</td>
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<td>R orbital frontal cortex</td>
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<td>R inferior frontal gyrus</td>
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<td>R caudate</td>
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<td>R thalamus</td>
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R = right; L = left.

<sup>a</sup>Indicates regions associated with the mentalizing network. Note that all survive at a stricter correction ($z > 3.1$).
and the posterior cingulate cortex (PCC; see Table 1 and Figure 3A).

**Hypotheses 3A and 3B: vMPFC and PCC Associated with Preferential Ingroup Evaluation Starting Points**

Group effects on evaluation starting point overlapped with activity during ingroup evaluation in a subregion of the vMPFC activation and PCC activation found in the group contrast (Figure 3A; Table 2). That is, different expectations about their final response (i.e., discrepancy between starting points) was related to engagement of the vMPFC and PCC when evaluating ingroup politicians (Figure 3B). Higher activation in vMPFC and PCC were associated with the extent to which participants began with an expectation to respond “yes” for ingroup evaluations. Group effects on evidence accumulation processes

**Table 2. DDM Parameter Estimate Regressions on the Ingroup > Outgroup Contrast**

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Neural Region</th>
<th>Brodmann’s Area</th>
<th>Max Z</th>
<th>x</th>
<th>y</th>
<th>z</th>
<th>No. of Voxels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group effects on starting point (controlling for drift rate)</td>
<td>L inferior frontal gyrus</td>
<td>44</td>
<td>4.03</td>
<td>−44</td>
<td>6</td>
<td>16</td>
<td>2651</td>
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<tr>
<td></td>
<td>L postcentral gyrus</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ventral medial prefrontal cortex</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Posterior superior temporal sulcus</td>
<td>22</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Posterior cingulate</td>
<td>23</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>L thalamus</td>
<td></td>
<td>3.68</td>
<td>−16</td>
<td>−22</td>
<td>8</td>
<td>1207</td>
</tr>
<tr>
<td>Group effects on drift rate (controlling for starting point)</td>
<td>L hippocampus</td>
<td>54</td>
<td>4.62</td>
<td>−22</td>
<td>−30</td>
<td>26</td>
<td>1421</td>
</tr>
<tr>
<td></td>
<td>L thalamus</td>
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R = right; L = left.

*Indicates regions associated with the mentalizing network. Note that activation in these regions for the regression analysis do not survive at a stricter correction (z > 3.1).
DISCUSSION

The current study provides a bridge between psychological and neural models by deepening our understanding of how motivational factors (e.g., interest in portraying the personality traits of ingroup members in a more flattering light; Fiske & Taylor, 2017; Hewstone et al., 2002; Kunda, 1990) influence mentalizing network activation. The findings suggest that the vMPFC and PCC activation associated with ingroup trait evaluation may be modulated by differential a priori attitudes; no significant association was found for differential rates of searching through previous knowledge to feel comfortable enough to choose a response (a possibility introduced by the use of relatively familiar targets in the current paradigm rather than the unknown targets used in much of previous research). That is, the current study suggests that vMPFC and PCC are modulated by the extent to which people have an initial expectation of responding with a positive response option toward members of their ingroup (starting points that favor a “yes” response). Additionally, the current study provides another data point in the debate over whether ingroup trait evaluations generally increase activation in the mentalizing network (Molenberghs & Louis, 2018; Freeman et al., 2010; Harris & Fiske, 2007) or whether dMPFC is an exception that shows increased activation for outgroup trait evaluation (e.g., Mitchell et al., 2006). The current study found that many regions associated with the mentalizing network are more strongly engaged for evaluating ingroup members with the exception of dMPFC. The dMPFC tends to be associated with evaluating outgroup members. The current findings have several implications for advancing models of motivated sociocognitive processes.

One implication of the present research is that current efforts to delineate the psychological significance of regions associated with the mentalizing network (e.g., Molenberghs et al., 2016; Schurz et al., 2014) may benefit from considering motivational factors that influence the evaluation of targets of mentalizing (for a review, see Hewstone et al., 2002). For example, the current findings represent a new direction for previous meta-analyses, which have investigated whether subregions of the mentalizing network show differential associations with characteristics of mentalizing (e.g., cognitive vs. affective, explicit vs. implicit, imagery vs. pictorial depiction; Molenberghs et al., 2016; Schurz et al., 2014). The current research highlights that characteristics of the mentalizing target, such as group membership, may also influence the engagement of mentalizing regions. The current research contributes new data to consider when evaluating the existing speculations that ingroup evaluations should increase regions associated with mentalizing (e.g., Molenberghs & Louis, 2018; Freeman et al., 2010; Harris & Fiske, 2007) or that there may be one important exception: Outgroups increase dorsal regions of MPFC (Mitchell et al., 2006; but see Tamir & Mitchell, 2010). The current findings favor the latter hypothesis: When people evaluate the traits of familiar ingroup and outgroup individuals, vMPFC and PCC engagement for ingroup evaluation may be modulated by a priori attitudes and increased dMPFC activation is associated with outgroup evaluation.

Does the increase in vMPFC activation for ingroup trait evaluation and decrease in dMPFC activation for outgroup trait evaluation suggest that evaluating others’ traits reflect different degrees of self-related processing? The differential degree of self-related processing interpretation may be tempting because previous research has suggested that vMPFC activation tends to be higher for self-evaluation and evaluation of close others compared with unknown others (Murray, Schaer, & Debbané, 2012; but see Qin & Northoff, 2011) whereas dMPFC activation may be increased for the evaluation of unknown others compared with self-evaluation (Denny, Kober, Wager, & Ochsner, 2012). However, these studies tend to directly compare self-evaluation to the evaluation close others and unknown others. The current study did not measure self-evaluation nor reference that kind of comparison. However, it may be possible that ingroup politicians simply evoked more of an association with the self than the outgroup politicians. Research that has more directly examined instances in which association to the self is used to evaluate others (e.g., self-projection or perceived similarity between self and other) has yielded mixed results such that it is not clear what pattern of activation within MPFC would be expected to reflect different degrees of self-projection. For example, studies have found that perceived associations between self and others can increase MPFC activation (e.g., Jenkins, Macrae, & Mitchell, 2008; Mitchell et al., 2006; Mitchell, Banaji, & Macrae, 2005), decrease MPFC activation (Tamir & Mitchell, 2010; Mitchell et al., 2006), or not affect MPFC activation (e.g., Perry, Hendler, & Shamay-Tsoory, 2011; Krienen, Tu, & Buckner, 2010; Tamir & Mitchell, 2010, Study 2). Therefore, it is important to exercise caution when interpreting the current results in relation to self-projection onto others as it was not directly measured nor does previous research point to a strong hypothesis about an expected pattern of activation.
self and certain other people (compared with nonsocial targets), the current study is consistent with more recent research suggesting that vMPFC subregions are associated with evaluating the self and others in a nondispassionate manner (Delgado et al., 2016; Flanagan & Beer, 2013; Beer, 2007). For example, the vMPFC is associated with increased attribution of positive traits and decreased attribution of negative traits to the self and relationship partners (Hughes & Beer, 2012, 2013). Additionally, vMPFC regions have been associated with making self-flattering attributions of other people’s evaluations of the self (i.e., meta-perceptions). When social settings provide ambiguous social feedback, vMPFC activation predicts the extent to which people assume others are seeing them in a flattering light (Flagan et al., 2017). Consistent with research on self-evaluation, the current research suggests that vMPFC also plays a role in flattering evaluations of the internal qualities of familiar ingroup members.

The current research helps to expand the focus of research at the intersection of neurocognitive function and political science (Schreiber, 2017; Krastev et al., 2016; Hibbing, Smith, & Alford, 2014). Much of the previous research has examined how political affiliation influences the neural underpinnings of cognitive processing. For example, there has been intense debate about whether political affiliation may affect sensitivity to negative information and threat (Bakker, Schumacher, Gothereau, & Arceneaux, 2019; Hibbing et al., 2014) and how ideology may affect volume of brain structures (Jost & Amodio, 2012). The few discussions of the intersection of politics and mentalizing tend to rely on research involving racial groups because of the dearth of studies on trait evaluation of political figures (e.g., Kedia, Harris, Lelieveld, & van Dillen, 2017; Schreiber, 2017). The current research contributes to the field of political neuroscience by providing insight into the neurocognitive mechanisms that underlie the evaluation of familiar ingroup and outgroup political figures.

Future research would benefit from addressing potential caveats to the current research. For example, participants were not asked to rate their familiarity with each politician. Two of the three outgroup politicians were currently elected at the time of data collection. However, the interpretation that group affiliation drives the results in the current study would be strengthened by understanding whether effects still hold when accounting for potentially greater familiarity with ingroup members. Additionally, the current study examined a particular ingroup: Democrats. Currently, there is a debate over whether there are significant cognitive differences between liberal and conservative individuals (e.g., Schreiber, 2017). Therefore, it would be beneficial to understand whether the results in the current study replicate when ingroup affiliation is not tied to liberal political ideology.

In conclusion, this study represents a step toward integrating psychological and neural models of motivated social cognition. Specifically, the research investigated how group affiliation affects the engagement of regions typically associated with mentalizing for tasks of trait evaluation. In contrast to previous research, this study examined trait evaluation of familiar political figures using computational methods to address self-report issues and a relatively large sample. Findings suggest that when individuals are evaluating a familiar political figure, mentalizing regions such as MPFC and PCC may reflect preferential attitudes applied to ingroup evaluation, yet outgroup evaluation tends to also increase activation in at least one region previously associated with mentalizing: dMPFC. The findings illustrate the importance of incorporating motivational factors as a fruitful avenue for building neural models of social processing.

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